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DIGITAL COMPILATION OF GRAVITY DATA FOR NEW BRUNSWICK

H.H. Hassan

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(Contribution to the NATMAP Magdalen Basin Project; New Brunswick Geological Surveys Branch ordinary budget)

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DIGITAL COMPILATION OF GRAVITY DATA FOR NEW BRUNSWICK

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Prepared for:
The New Brunswick Department of Natural Resources and Energy
March 1996

Contribution to the NATMAP Magdalen Basin Project;
New Brunswick Geological Surveys Branch ordinary budget.

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ABSTRACT

A total of 32,352 gravity points, that cover the entire province of New Brunswick, and parts of Nova Scotia and Quebec, were digitally compiled from various sources, and reduced to the mean sea level in order to make a single data set. The data are processed and stored in a form compatible with the format of the National Gravity Data Base of the Geodetic Survey Division, Geomatics Canada. Bouguer and free-air gravity maps were produced using 23,092 useable points from the data set.

The compiled gravity data will be accessible to the public, which will facilitate its exploitation for resource exploration and geodetical purposes.

RÉSUMÉ

Un total de 32 352 points gravimétriques, couvrant l'ensemble du Nouveau-Brunswick et des parties de la Nouvelle-Écosse et du Québec, ont été compilés numériquement à partir de sources diverses et réduits au niveau moyen de la mer afin de ne constituer qu'un seul ensemble de données. Ces données sont traitées et mises en mémoire dans un format compatible avec celui de la Base nationale de données gravimétriques, de la Division des levés géodésiques de Géomatique Canada. Des cartes des anomalies gravimétriques de Bouguer et des anomalies gravimétriques à l'air libre ont été dressées en se servant de 23 092 points utilisables tirés de l'ensemble de données.

Les données gravimétriques compilées seront accessibles à la population pour faciliter leur exploitation à des fins géodésiques et de prospection de ressources.

ACKNOWLEDGMENTS

Sincere appreciation is expressed to the scientific authority of the project, Dr. F. Marillier and Paul Durling of the Atlantic Geoscience Centre for their continuous interest, support and advice. Appreciation is also extended to M. J. McLeod of the New Brunswick Department of Natural Resources and Energy, who managed the project, provided funding and edited the report. Clint St. Peter of the New Brunswick Department of Natural Resources and Energy was instrumental in obtaining gravity data from Chevron Canada Resources Ltd. Paul Rennick, Diane Richard and Kenneth Mersereau of the New Brunswick Department of Natural Resources and Energy produced the final hard copy products in a CARIS-compatible format. Thanks is also extended to D. B. Hearty, Gravity Surveys Manager with Geomatics Canada, for his assistance with data base format. The author also benefited from the many useful suggestions and comments of Dr. K.B.S. Burke of the University of New Brunswick, to whom I express my deep appreciation.

DIGITAL COMPILATION OF GRAVITY DATA FOR NEW BRUNSWICK

Introduction

Parts of the Province of New Brunswick have been surveyed extensively by the gravity method during the last sixty years. Regional, reconnaissance and detailed gravity data were collected from many parts of the province especially in the southeast in areas underlain by Carboniferous rocks. Most of these surveys were conducted to augment geological mapping, potash exploration and, to some extent, oil exploration. The significant density contrast between carboniferous evaporites and other fluvial-deltaic rocks makes the gravity survey an excellent tool for potash exploration in the Carboniferous sedimentary basin. Similarly, the pronounced density contrast between the pre-Carboniferous basement and the overlying sedimentary rocks provides a suitable condition for using gravity surveys to map the basement topography and structures.

Until very recently, other parts of New Brunswick had sparse gravity survey coverage, even in the vicinity of the base-metal sulphide producing areas of Bathurst. It is notable that gravity methods have been very successful in base-metal sulphide exploration elsewhere.

The gravity data provide valuable information on the three-dimensional geological structure of the earth's upper crust and hence on its oil, coal, potash and mineral resources. Therefore, in order to make the maximum potential of the gravity data in New Brunswick, the New Brunswick Department of Natural Resources and Energy in cooperation with the Atlantic Geoscience Centre has initiated a program to make these data readily available for the public by digitally compiling the existing gravity data from several sources. These are unified into a single form compatible with the format of the National Gravity Base in Ottawa. Funding for this project was supplied by the New Brunswick Department of Natural Resources and Energy.

Gravity Surveys in New Brunswick

The first gravity survey carried out in New Brunswick was in 1932 and was followed by other surveys in 1935 and 1943 (Miller 1946). These surveys were conducted jointly by the Geological Survey of Canada and the Dominion Observatory, Ottawa over the Carboniferous Basin in order to delineate geological structures and to establish a network of gravity stations.

In 1944, another gravity survey was carried out, over the same area, by A.H. Miller of the Dominion Observatory under the guidance of Dr. George P. Woollard of Wood Hole Oceanographic Institution, Wood Hole, Massachusetts, U.S.A. During this survey a 'Truman' gravimeter was used (Miller 1946). Twenty-seven gravity base stations were established by using the looping method described by Nettleton (1940). Most of the observations are reported to be correct to one milligal as determined by repeated observations. Elevation of the stations were taken either from rail elevations published by the Geodetic Survey of Canada or from 1:63 360 and 1:126 720 scale topographic maps. For some stations, where elevation could not be obtained from these two sources, an aneroid barometer (Paulin System) was used to obtain elevations. The barometer was checked against known elevations several times a day and station elevations are believed to be correct to ± 1.5 m (Miller 1946). The results of this survey, in general, supported the presumed existence of deep seated northeast-trending pre-Carboniferous ridges (horst structures) within the Carboniferous basin.

Following-up on a seismic exploration program for oil, Shell Oil Exploration conducted a gravity survey of parts of the Moncton Basin in 1950 to help establish trends of basement uplifts, and to locate diapiric and intrusive salt bodies (Gussow 1953). Two gravity maps with anomalies contoured at 0.2 mGal intervals were produced by Radar Exploration Co. Ltd., at a scale of one inch to one mile. Gussow (1953) used the data to outline basin areas and to locate structures in which salt accumulation was involved.

In the 1960's, Professor G. Konecny and students of the Survey Engineering Department of the University of New Brunswick completed a regional gravity survey by taking measurements along the roads and highways of New Brunswick. They used a LaCoste Romberg

Model G28 gravimeter and read about 4000 stations. Eight Bouguer anomaly maps with 5 mGal contours were produced at a scale of 1:250 000 from these data (Konecny 1970).

In 1970, a detailed gravity survey was made in the Sussex area by the Mineral Resources Branch of the New Brunswick Department of Natural Resources. Gravity observations were made at 185 stations using a LaCoste Romberg Model G28 gravimeter to identify the best borehole locations to investigate salt bodies by a subsequent drilling program (Burke 1971). The serendipitous intersection of potash in the first borehole drilled as a result of this survey initiated the development of the potash industry in New Brunswick and the use of the gravity method in exploration for this important commodity.

Over the subsequent years, two major gravity surveys were initiated in New Brunswick in relation to the potash deposits. The first survey was carried out during the period 1971 to 1974 over an area of approximately 1400 square kilometres (Chaisson 1975). The aim of this survey was to provide information on the extent of potash deposits within the Lower Carboniferous Windsor Group. This project was jointly sponsored and funded by the New Brunswick Department of Natural Resources and DREE. Approximately 4100 gravity stations, mostly along roads, were established during this survey. A Scintrex CG-2 gravimeter was used with a sensitivity of $\pm$ 0.01 mGal. Gravity control stations were established at major intersections in the survey areas by tying into National Gravity Base Stations at Hampton, Petitcodiac, Moncton Airport, Hopewell Cape and Alma. Station positions were located on 1:15 840 scale base maps by chaining in the field between easily recognizable features. Station elevations were measured by differential leveling using a Zeiss Ni22 automatic level. The total error associated with the Bouguer anomaly values was estimated to be $\pm$ 0.273 mGal. Terrain corrections were not performed on the data. Theoretical gravity values were computed using the International Union of Geodesy and Geophysics formula of 1930, and a reduction density of 2.67 g/cm^3 was used. This survey was able to successfully delineate six separate negative gravity anomalies attributed to low density evaporite deposits at Cassidy Lake, Plumweseep, Millstream, Gordon Brook, Weldon and Riverside. The first three anomalies have been proven to contain potash deposits by subsequent diamond drilling.

The successful delineation of the above mentioned three productive potash deposits during the 1971-1974 gravity survey led to the initiation of a second survey which was also sponsored and funded by DREE. Additional coverage was needed to clearly define the extent of the existing deposits and also to evaluate the salt/potash potential in other regions of New Brunswick. The survey was conducted during the period 1977 to 1981 by staff of the New Brunswick Department of Natural Resources and Energy (Chandra *et al.* 1982). A Scintrex CG-2 gravimeter was also used during this survey. Data acquisition, correction and reduction used during the course of this survey were more or less identical to that used in the earlier 1971 to 1973 gravity survey. As in the previous survey, terrain corrections were not applied to the data. Thus, it is anticipated that the total error associated with the values of the Bouguer anomaly is more or less equal to that produced during the 1971 to 1973 gravity survey (i.e. 0.273 mGal).

In the early 1970's, a regional gravity survey was made over part of the Caledonia Highlands, in support of an extensive airborne and geological mapping program by the New Brunswick Department of Natural Resources and DREE. The purpose of the survey was to provide additional geological information, particularly on the deeper structure of the region (Burke 1976). A total of 789 gravity stations were read along roads and forestry trails using the LaCoste Romberg G28 gravimeter. National Gravity Base stations at Saint John, Sussex and Alma were used as control stations for the survey. This survey, in general, delineated a pattern of positive Bouguer anomalies which were closely associated with high density mafic rocks in the area.

A major gravity survey was carried out in 1976 for the entire area of New Brunswick on a regional basis by the Earth Physics Branch (currently incorporated in the Geological Survey of Canada) as part of the National Gravity Mapping Program. During this survey, 7,537 gravity stations were established at an average spacing of 5 km (Earth Physics Branch 1977). The gravity data from this survey have been published in a series of 1:50 000 maps covering all of New Brunswick and adjacent areas of Northumberland Strait, Bay of Fundy, Nova Scotia and Quebec. Chandra *et al.* (1979) used the Bouguer gravity values of this survey to compute regional, residual and second vertical derivative maps for different areas of New Brunswick on

1:250 000 scale maps. The regional, residual and second derivative techniques were first tested on the Amherst map sheet (NTS 21 H/16) in southeastern New Brunswick. The technique of Griffin (1949) was used to compute the residual and regional components, whereas those of Henderson and Zietz (1949), Elkins (1951) and Rosenbach (1953) were used to compute the second derivative values. The aim of the test according to Chandra *et al.* (1979) was to determine suitable parameters that would emphasize the gravity expression of salt bodies. The randomly distributed Bouguer gravity data on the Amherst map sheet were first manually contoured; then the contour map digitized (manually as well) at a 2.5 km grid spacing. Afterward, the computations were carried out by using a computer program on the grids. Computations were done at every grid point (i.e. every 2.5 km) using a graticule size of 5 km. The test revealed that the Elkins (1951) method was the most suitable technique to compute the second derivative values for Bouguer gravity data for the test area. Thus, the Griffin (1949) and Elkins (1951) methods were chosen to produce the regional, residual and second derivative maps for the other parts of the province.

A detailed gravity survey was conducted in the vicinity of the Lake George antimony mine by the New Brunswick Department of Natural Resources in 1980 (Chandra *et al.* 1980). The aim of this survey was to delineate the extent of the antimony ore in the area. Measurements were taken with a Scintrex CG-2 gravimeter at approximately 150 m intervals.

Gravity data were also used to define geological structures possibly related to a series of earthquakes of magnitude 5.2 which occurred on January 9, 1982 in the Miramichi area. A detailed gravity survey commenced in March 1982 (Burke and Chandra 1983). Gravity readings at 500 m intervals were taken with a Scintrex CG-2 gravimeter on frozen lakes during the winter and on land during the summer with station intervals of 500 m. In addition, gravity readings were taken along seven profiles in a survey financed by Weston Geophysical Corporation of Westboro, Massachusetts. Station elevations were determined by using a Hewlett Packard Electronic Distance Meter for most of the area, but part of the land survey was supplemented by conventional leveling. The precision of the elevation are reported to be between 1 to 3 m on the lakes and between 0.1 to 1.0 m on land, as estimated by repeated determinations of about 5% of the stations (Burke and Chandra 1983). No terrain corrections have been applied to the data and

Bouguer anomalies were computed by using a reduction density of 2.67 g/cm^3 and a datum surface of mean sea level. The results of this survey have indicated that the epicentre of the earthquake is underlain by granitic rocks of the Devonian North Pole Stream Pluton. A two-and-a-half dimensional modeling of the pluton suggested that it has a thickness of 8 km and is overlain by metasedimentary rocks with a thickness varying between 0 to 1 km. Accordingly, Burke and Chandra (1983) have suggested that the earthquake was confined within the North Pole Stream Pluton, since seismological investigations by Wetmiller *et al.* (1982) indicated that the focal depths for the aftershock sequence are in the range from 1 to 7 km.

During the period 1981 to 1984 Eastern Geophysics Ltd. of Halifax carried out a detailed gravity survey in southeastern New Brunswick for Chevron Canada Resources Ltd. A total of 10,921 gravity stations were read during this survey which were taken simultaneously with a reflection seismic (vibroseis) survey by Chevron Geoscience Company. The actual vibroseis shot points were used as gravity stations. LaCoste Romberg Model G371 and Model G353 gravimeters were used throughout the survey and all the gravity points were tied to several National Gravity Base Stations located in the area. Terrain corrections utilizing the Hammer chart were performed on these data (Arthur 1985; Augsten 1982; Feeney 1983 a,b; Guay 1984).

Gravity data were also investigated in connection with geothermal energy potential of hot dry rocks in New Brunswick. For this purpose, a gravity project was initiated in 1984 to investigate the Saint George Batholith, southwestern New Brunswick (Thomas and Willis 1989). This project was conducted under the auspices of the Federal Geothermal Energy Program and its aim was to evaluate geothermal energy potential of the batholith. Three gravity traverses, trending approximately north-south, with a station spacing of 2 km at maximum were surveyed to provide data to model the subsurface geometry of the batholith. A short gravity traverse across the Pleasant Ridge Granite, which is a small satellite stock located at the northern margin of the main outcrop area of the batholith was also carried out. A total of 157 gravity stations were surveyed using a geodetic-type LaCoste Romberg gravimeter and the survey was tied to gravity base stations of the National Gravity Network. Station elevations were determined by altimetry and tied to provincial and national bench marks in the area. The error associated with the station elevations is estimated to be ± 5 m and the standard error associated with the Bouguer

gravity values is estimated to be within ± 1.5 mGal (Thomas and Willis 1989). The Bouguer anomalies were computed by using a reduction density of 2.67 g/cm^3 and a sea level datum.

Two-and-a-half dimensional modeling was carried out on the Bouguer gravity data. The modeling revealed that the thickness of the Saint George Batholith is 6.6, 4.4, and 7.0 km in the western, central and eastern parts, respectively. In the eastern part of the Saint George Batholith near the Welsford heat-flow site (Drury *et al.* 1987), the modeling indicates that the batholith is about 6.5 km thick. This thickness is far beyond the 1.4 and 3.3 km radiogenic thickness calculated by Drury *et al.* (1987) using the heat-flow and heat-generation relationships of Wright *et al.* (1980). This discrepancy between the radiogenic thickness of the batholith and the thickness derived from gravity data led Thomas and Willis (1989) to believe that the radiogenic elements have been concentrated in the upper part of the batholith.

In the summer of 1988, a detailed gravity survey was carried out in the Smithtown - Titusville area (latitude 45° 25'00" – 45° 32'30", longitude 65°40'00" – 65° 50'00") of southeastern New Brunswick by the Geophysics Section of the Nova Scotia Research Foundation Corporation (Nova Scotia Research Foundation 1988). The aim of the survey was to define in more detail the extent and amplitude of a previously measured negative gravity anomaly and to assess the possibility of evaporites within the Carboniferous rocks. A total of 701 gravity stations with intervals of approximately 60 m were surveyed. A Worden Master gravimeter was used in the survey. Station elevations were determined by using a Wild NAK2 level. The data were corrected using the 1967 International Gravity formula and a reduction density of 2.67 g/cm^3. Terrain correction using the Hammer chart was applied on every second, third or fourth station, depending on the terrain condition of the area. A linear negative Bouguer gravity anomaly trending northeasterly and extending from Smithtown in the southwest to the vicinity of the Titus Brook in the northeast was delineated.

Several local detailed gravity surveys were conducted during the last five years in the Bathurst mine camp by the Geophysics Division of the Geological Survey of Canada in order to investigate the structural and tectonic setting of the Bathurst area. A total of 376 gravity stations were established at intervals of 200 to 700 m along seven profiles over the Elmtree Inlier and the

Miramichi Massif (Thomas *et al.* 1991). The vertical elevations of the stations were determined by altimetry. The horizontal positions of the stations were derived from NTS maps and supplemented by GPS (Global Positioning System) along roads that were not available on the NTS maps.

In the summer of 1993, the author of this report carried out a limited gravity survey for the New Brunswick Department of Natural Resources and Energy over Lutes Mountain in Moncton. A total of 230 gravity measurements were taken using a LaCoste Romberg gravimeter. The horizontal and vertical positioning of the gravity stations were determined by leveling. The gravity points were tied to a National Gravity Base Station at Coles Island and a density of 2.67 g/cm^3 was used to reduce the gravity data to the mean sea level. The aim of the survey was to delineate shallow igneous rocks to be used as a source for aggregates.

Gravity Data Sources

A total number of 32,352 gravity points were digitally compiled in this project. These data were derived from the following group of sources:

1. Earth Physics Branch: These data cover all areas in New Brunswick, but the majority of the data are confined to the Carboniferous Basin. There are 6,374 gravity stations (Earth Physics Branch 1977).

2. The New Brunswick Department of Natural Resources and Energy: These data are mostly measured in the southeastern part of the province mainly for the purpose of potash exploration. A total of 13,987 gravity points were contributed in the data base (Chandra *et al.* 1982).

3. University of New Brunswick: These data were measured by Dr. K.S.B. Burke of the Department of Geology for academic purposes and a total of 165 gravity stations were contributed from this source (Burke 1971).

4. Nova Scotia Research Foundation Corporation: A total of 264 gravity points were collected over the Cassidy Lake area in southeastern New Brunswick for the purpose of potash exploration (Nova Scotia Research Foundation 1975).

5. Allan Spector and Associate Ltd.: A total of 641 gravity points were measured over the Plumweseep area in southeastern New Brunswick for potash exploration (Spector 1976).

6. Eastern Geophysics, Halifax: A total of 10,921 gravity points were measured for Chevron Canada Resources Ltd. over the Carboniferous basin in southeastern New Brunswick during the period 1981-1984 (Arthur 1985; Augsten 1983 a,b; Guay 1984).

Gravity data of poor quality and/or not conformable with modern standard form were not included in this compilation. Confidential data were also excluded from this compilation. Furthermore, in order to avoid any duplication in the data, the recently acquired data by the Geological Survey of Canada that already exists in the National Data Base in Ottawa were not included in this compilation.

Data Reduction and Processing

The observed gravity value contains the effect of all the masses inside the earth as well as the effect due to the earth's shape and rotation. However, the main interest of exploration geophysicists is in the effect of the masses inside the earth. Therefore, in order to extract the portion that is associated with subsurface density variations within the earth's crust, the observed gravity values were subjected to a series of adjustments and corrections in order to calculate the gravity anomaly. The gravity anomaly is obtained by deducting the theoretical value for the ideal earth from the actual gravity value observed in the field, as shown below:

$$\delta g = g_o - g_t$$

Where, δg is the value of gravity anomaly, g_o is the observed value of gravity and g_t is its calculated theoretical value. The theoretical (computed) gravity value contains the effect of the

earth's shape and rotation, and for the compiled data in this project it is calculated according to the Geodetic Reference System 1967 (GRS67) which corresponds more or less to a simplified model of the earth. The formula used is as follows:

$$g_t = 978031.85\ (1 + 0.005278895\ \sin^2\theta + 0.000023462\ \sin^4\theta)$$

Where, g_t is the theoretical gravity value in mGal at θ geographic latitude on the spheroidal surface.

Therefore, by using the above formula all the compiled gravity data were referenced to the International Gravity Standardization Net (IGSN71) system which was adopted by many countries including Canada in 1974 (McConnell and Tanner 1974).

Afterward, all the gravity points were reduced to the same level (i.e. sea level) by performing the following corrections on the data:

- Bouguer correction
- Free-air correction
- Terrain correction

Following this, the Bouguer and the Free-air anomalies of the gravity data were calculated as follows:

$$BA = g_o - g_t + FC - BC + TC$$

$$FAA = g_o - g_t + FC + TC$$

Where :

BA = Bouguer anomaly in mGal

g_o = Observed value of gravity in mGal

g_t = Theoretical value of gravity in mGal

FC = Free-air correction (0.3086 mGal/m)

BC = Bouguer correction

(0.11174 mGal/m on the basis of density of 2.67 g/cm^3)

TC = Terrain correction

The reduction density used for calculation of Bouguer anomaly is postulated to be 2.67 g/cm^3, as it was used to reduce the gravity data in the National Gravity Data Base. Terrain correction was performed only on the data of Chevron Canada Resources Ltd. using the Hammer chart.

Computer contour plots of Bouguer and free-air anomalies were generated at a scale of 1:175 000 for each NTS map sheet in New Brunswick from the compiled digital data (Appendix I). Maps at a scale of 1:1 000 000 for the entire province are in the pocket.

Gravity Data Format

The formats and records for each gravity data source were different. Therefore, the data were processed separately with the initial step being a screening of the data, which involved removing incorrect gravity values from the data set. Afterward, the data were unified in a single form compatible with the format of the National Gravity Data Base.

The gravity data is organized according to a format provided by the Geodetic Survey Division, Geomatics Canada as described in Appendix II. However, some of the information listed in Appendix II is not available in some data sets. In these cases, the field was left blank.

The compiled data are sorted according to their source in a chronological order and presented in ASCII (OF2000-1ascii) and MS Access (OF2000-1access) formats. These files are stored on two diskettes that accompany this report.

CONCLUDING REMARKS

The gravity data selected for the National Gravity Data Base in Ottawa are of good quality and meet modern standard form with respect to acquisition, processing and reduction. These data can provide very useful information for geodetical and geophysical purposes such as the computation of the geod undulation, geodynamic investigation of the earth's crust, and resource exploration. These and other related problems can be satisfactorily analyzed if the gravity data are accurately measured and documented as in the data compiled in the present document.

Unlike some other geophysical data, gravity data require a special skill in their acquisition, processing, and reduction. For this reason, a considerable number of gravity data in the assessment files of the New Brunswick Department of Natural Resources and Energy were not selected for the data base.

Finally, since the present project was not designed to interpret the gravity data, future work should involve the interpretation of the data, particularly the part covering the Carboniferous Basin. The integration of the previously unused gravity data from Chevron Canada Resources Ltd. with other gravity data in the Carboniferous Basin may shed new information on the geological structures and mineral deposits of the basin.

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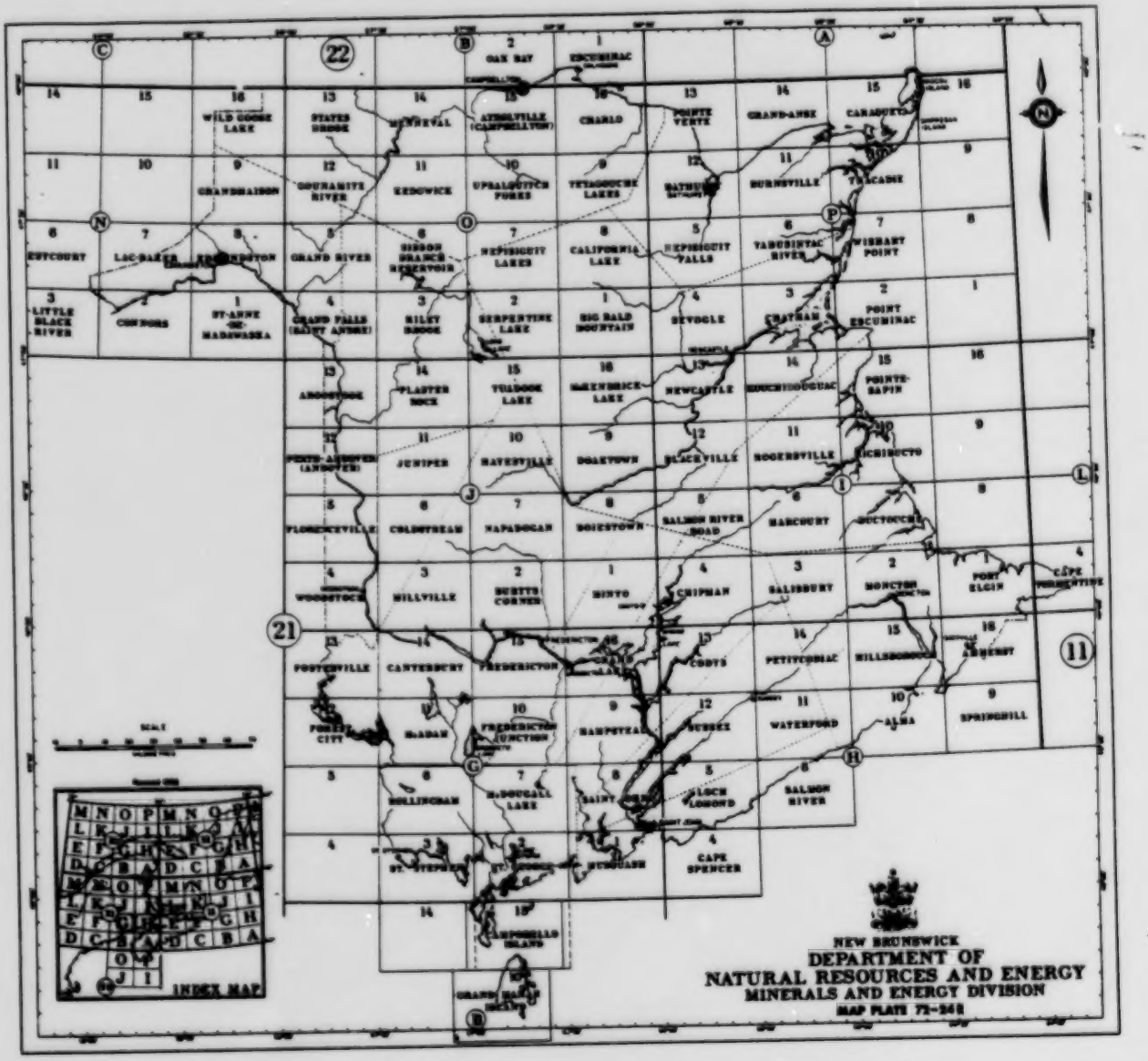
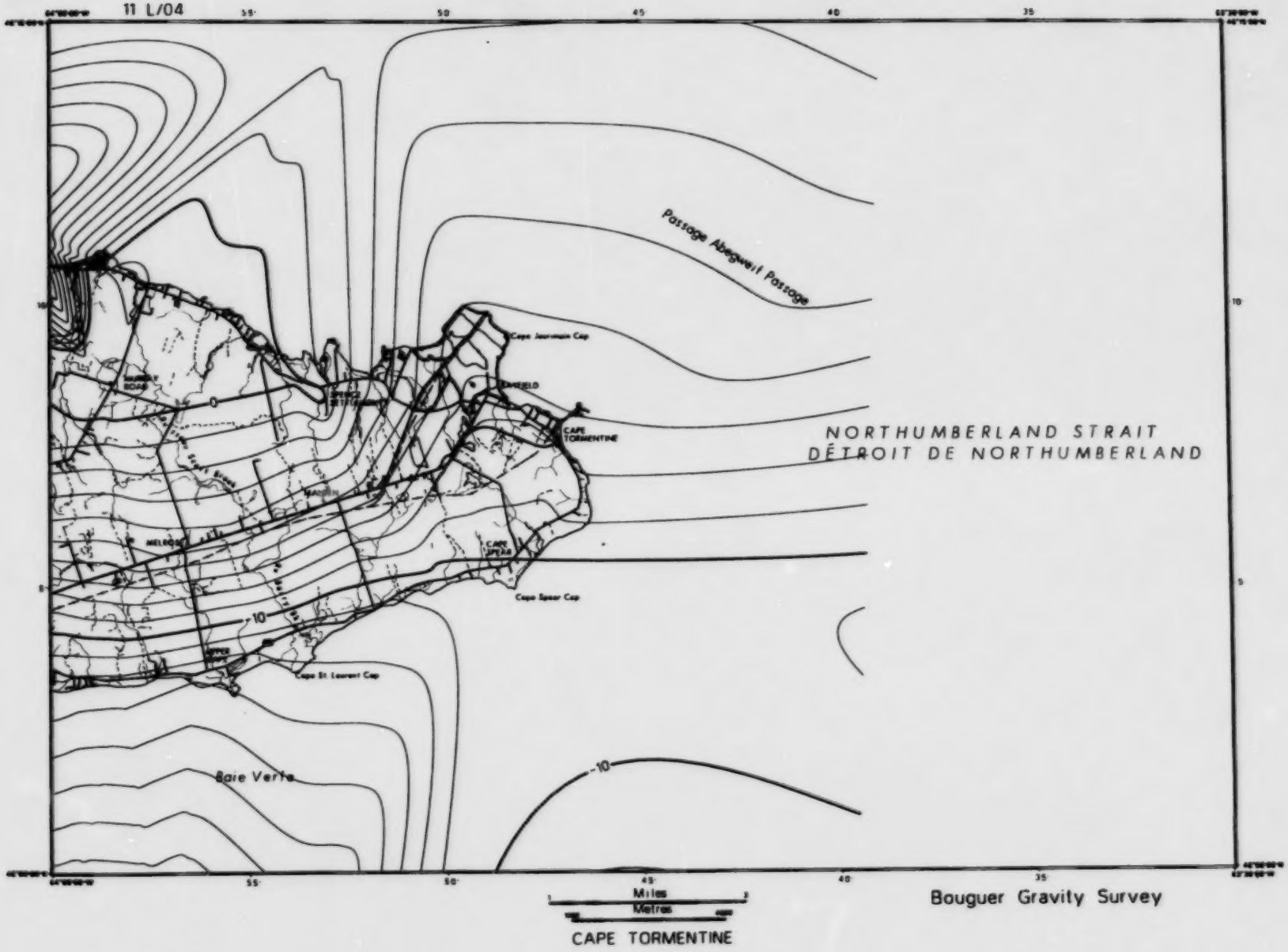
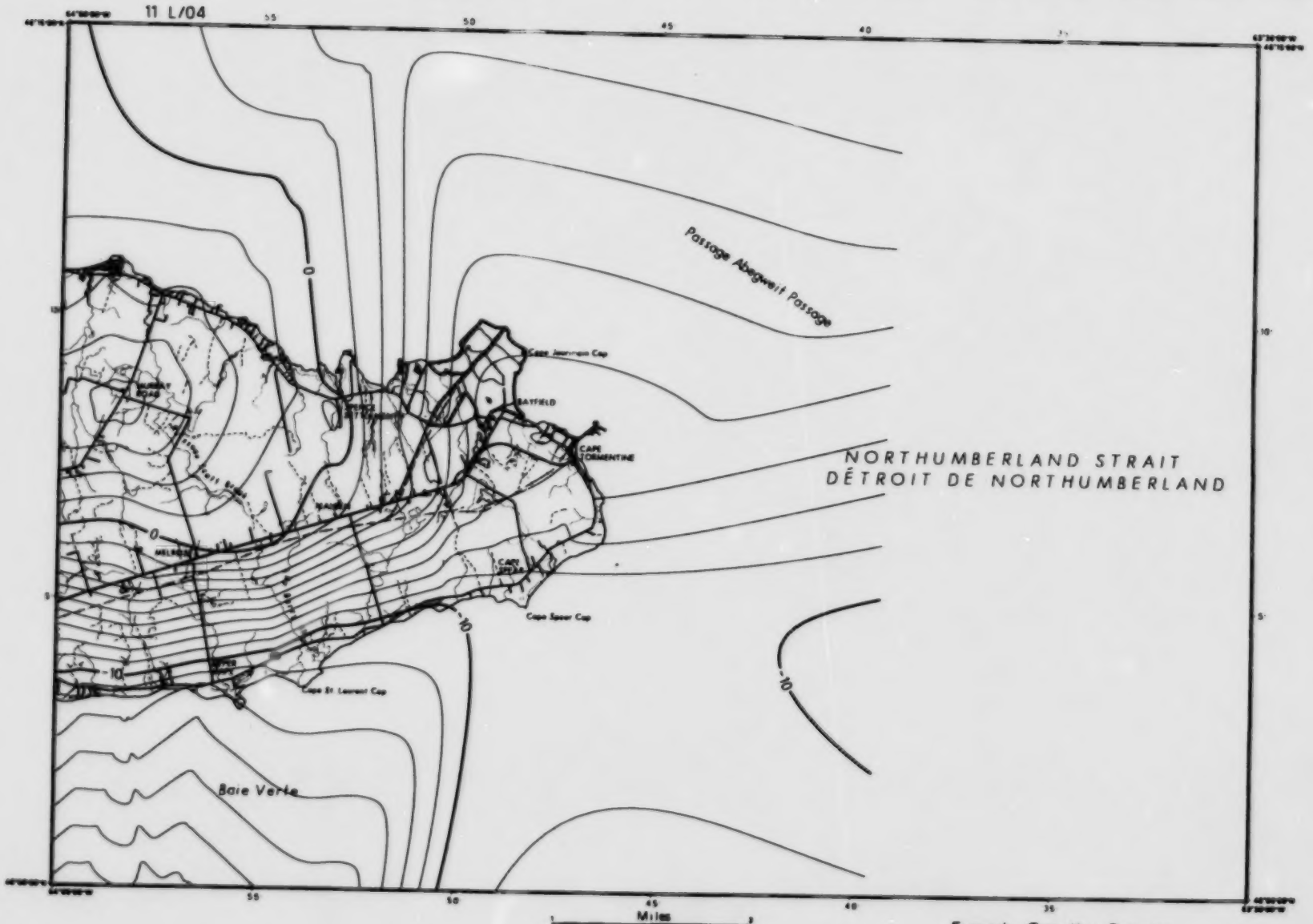
APPENDIX I

Bouguer and Free-air Anomaly Maps
of Each NTS Sheet in New Brunswick
(Scale: 1:175,000)


NEW BRUNSWICK
DEPARTMENT OF
NATURAL RESOURCES AND ENERGY
MINERALS AND ENERGY DIVISION
MAP PLATE 72-24I
INDEX MAP

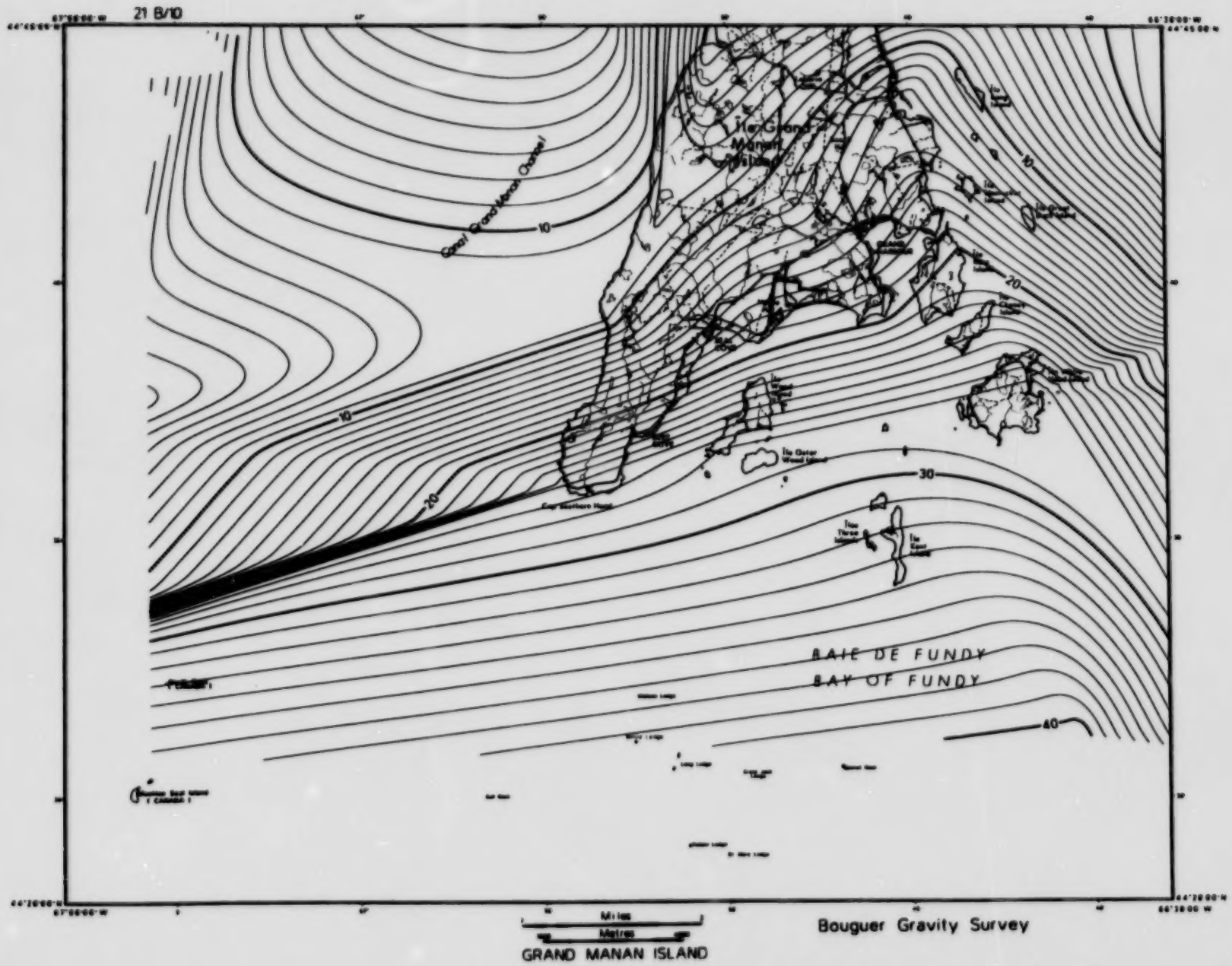


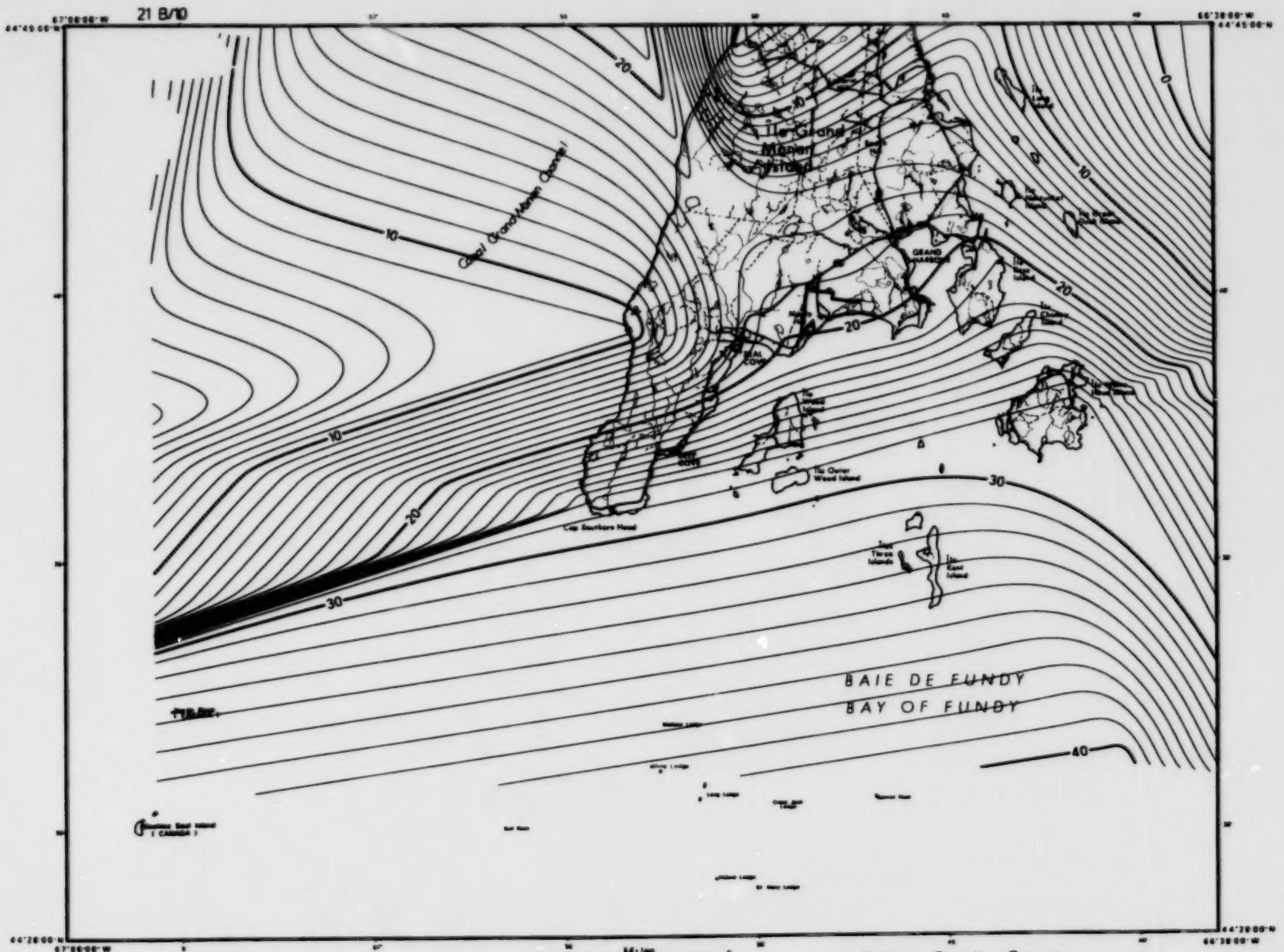
Bouguer Gravity Survey



CAPE TORMENTINE

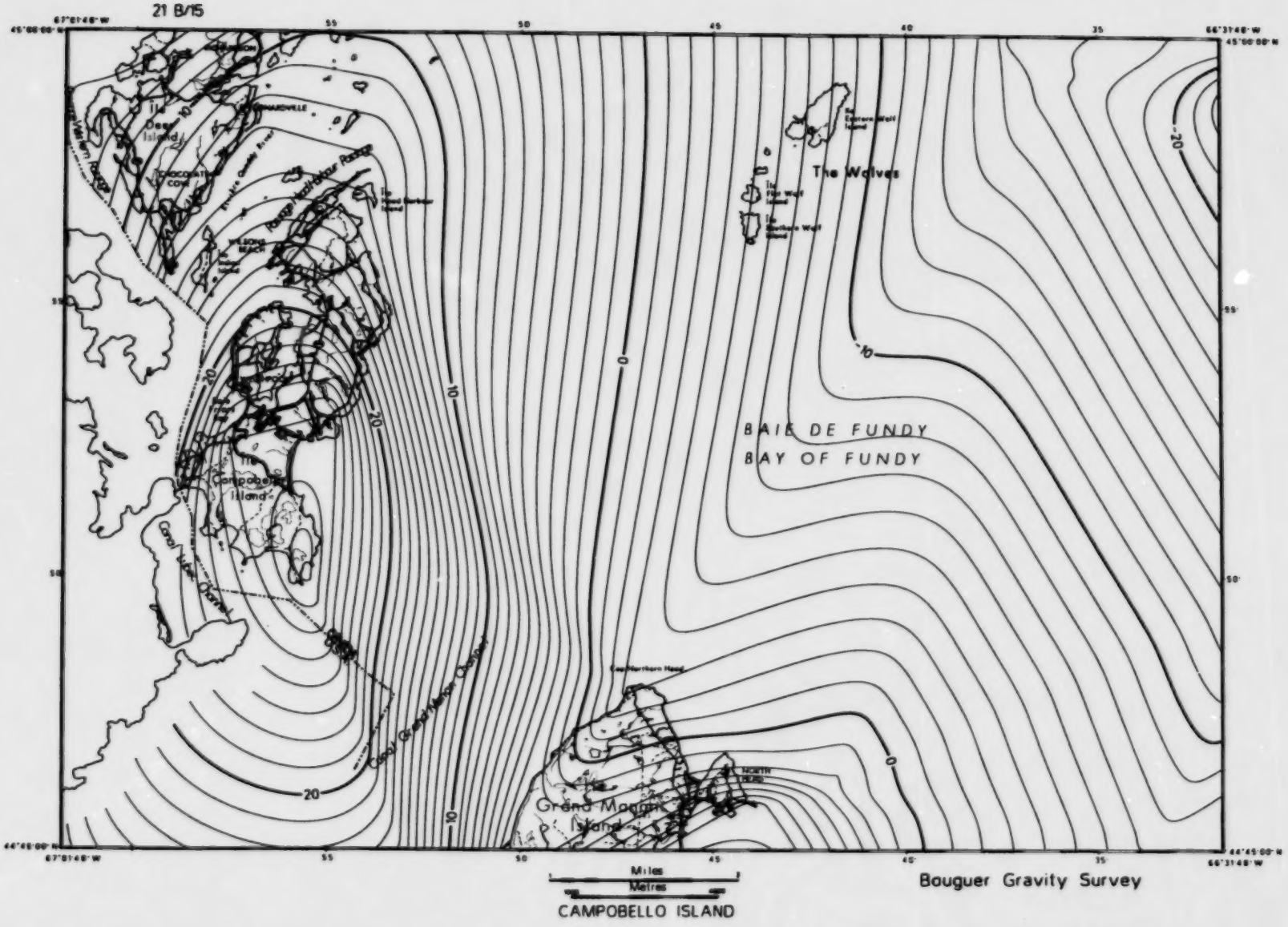
Freeair Gravity Survey

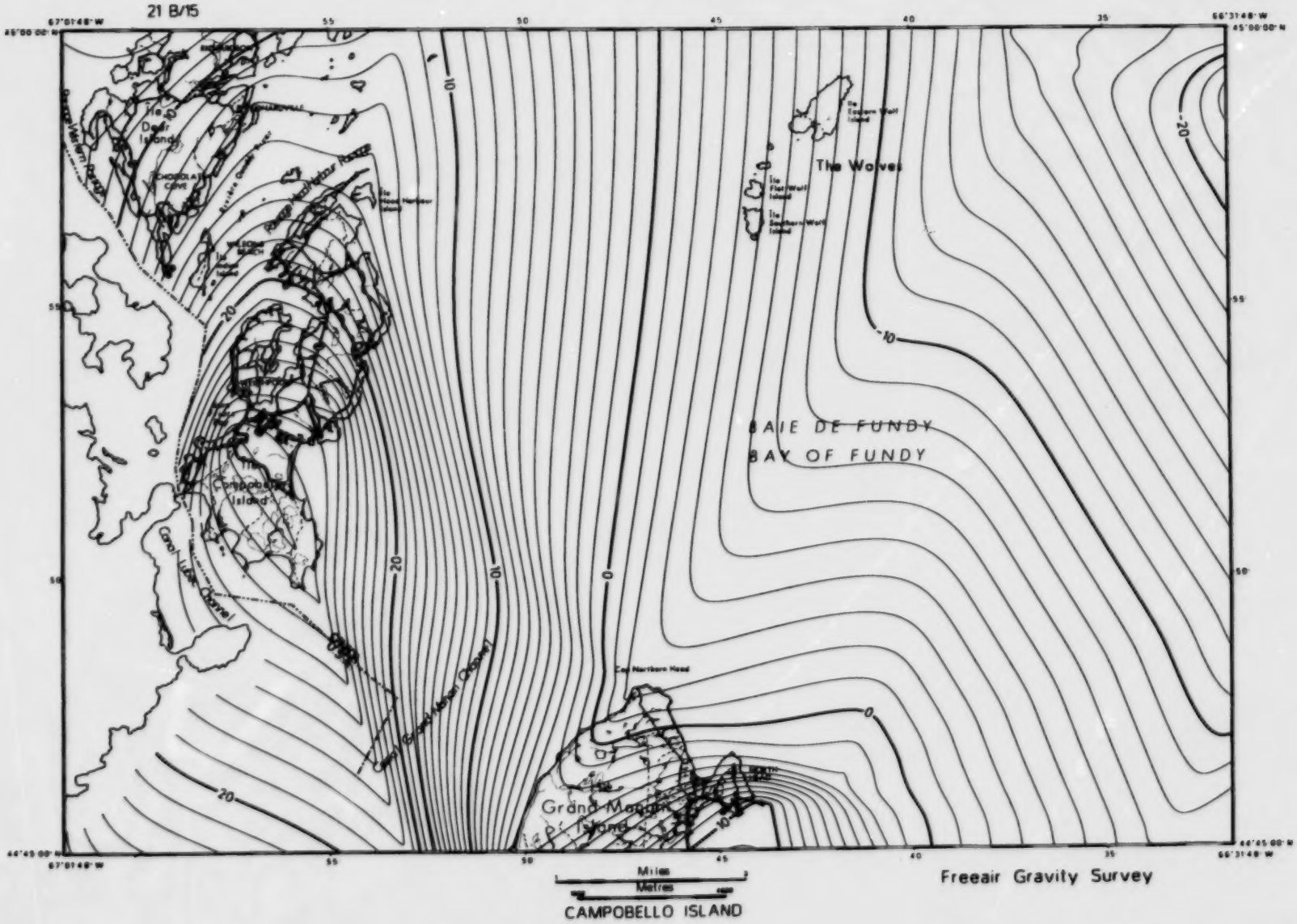

21 B/10
Grand Manan Channel
10
20
30
40
BAIE DE FUNDY
BAY OF FUNDY
Miles
Metres
GRAND MANAN ISLAND
Bouguer Gravity Survey

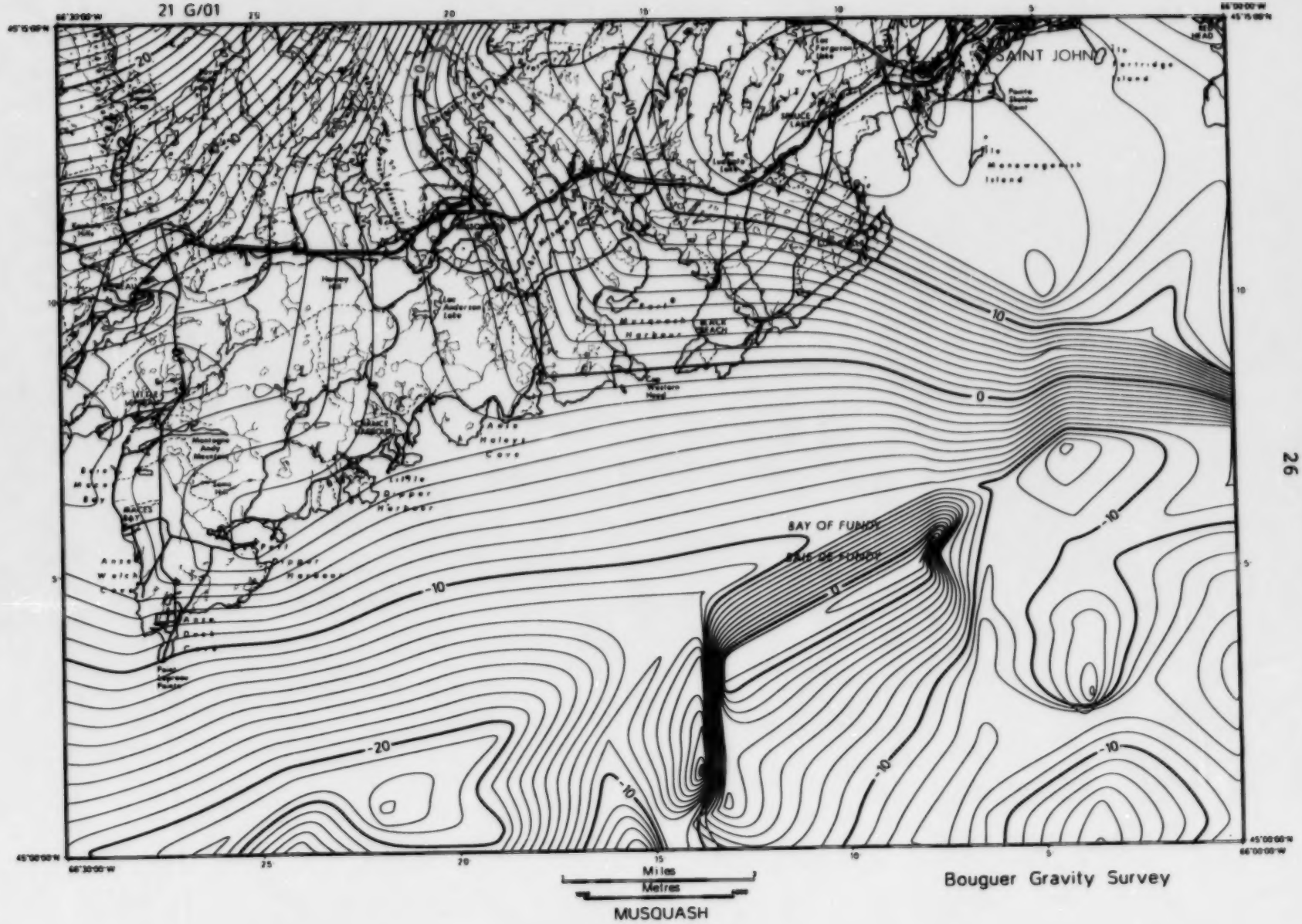


Freeair Gravity Survey

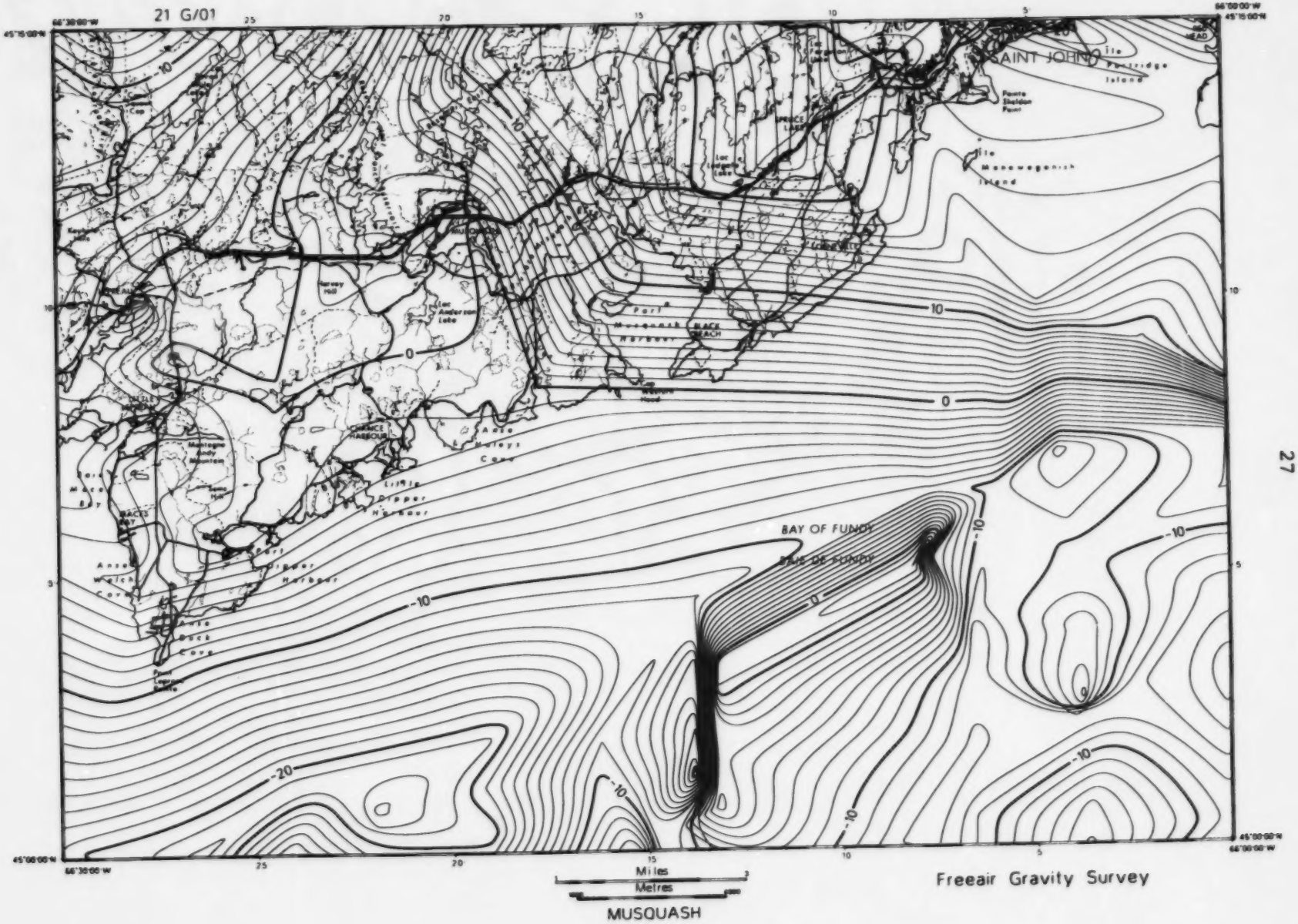
GRAND MANAN ISLAND

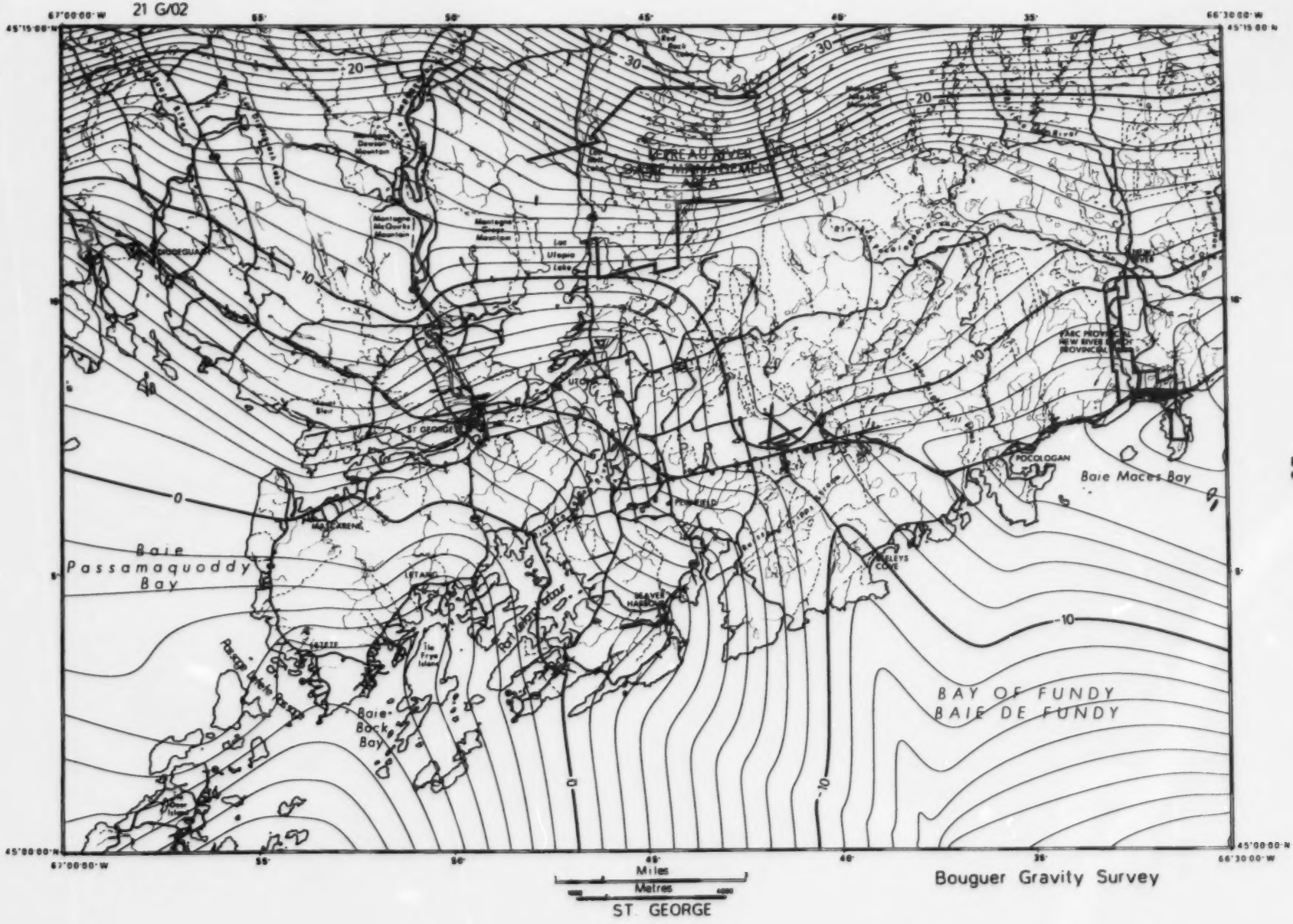

21 B/15
The Wolves
BAIE DE FUNDY
BAY OF FUNDY
Campobello Island
Grand Manan Island
Miles
Metres
CAMPOBELLO ISLAND
Bouguer Gravity Survey

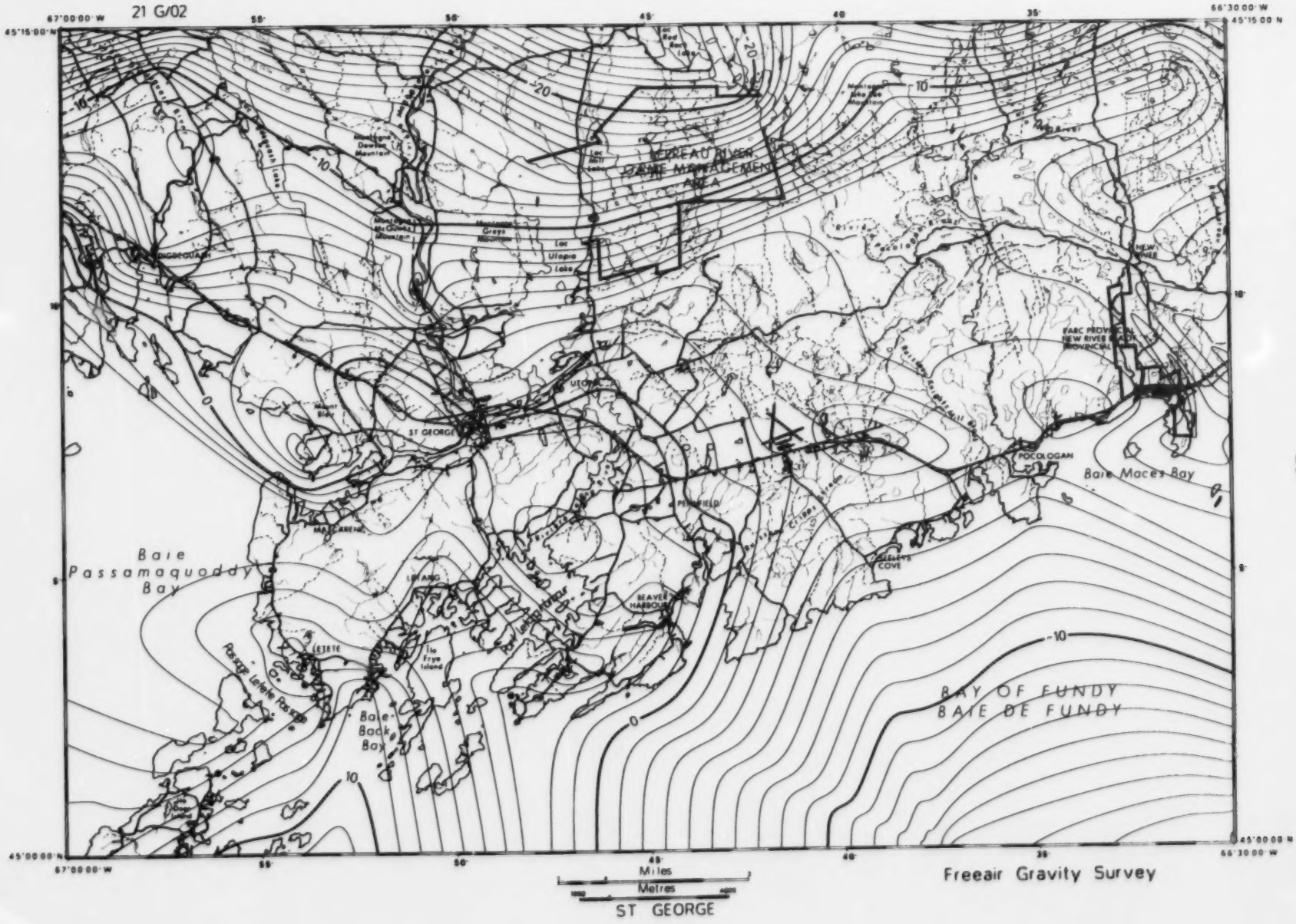

21 B/15
67°01'48"W
66°31'48"W
45°00'00"N
55
50
45
40
35
Deer Island
The Wolves
BAIE DE FUNDY
BAY OF FUNDY
Campobello Island
Grand Manan Island
Canal Letete Channel
Head Harbour Passage
Grand Manan Channel
Miles
Metres
CAMPOBELLO ISLAND
Freeair Gravity Survey

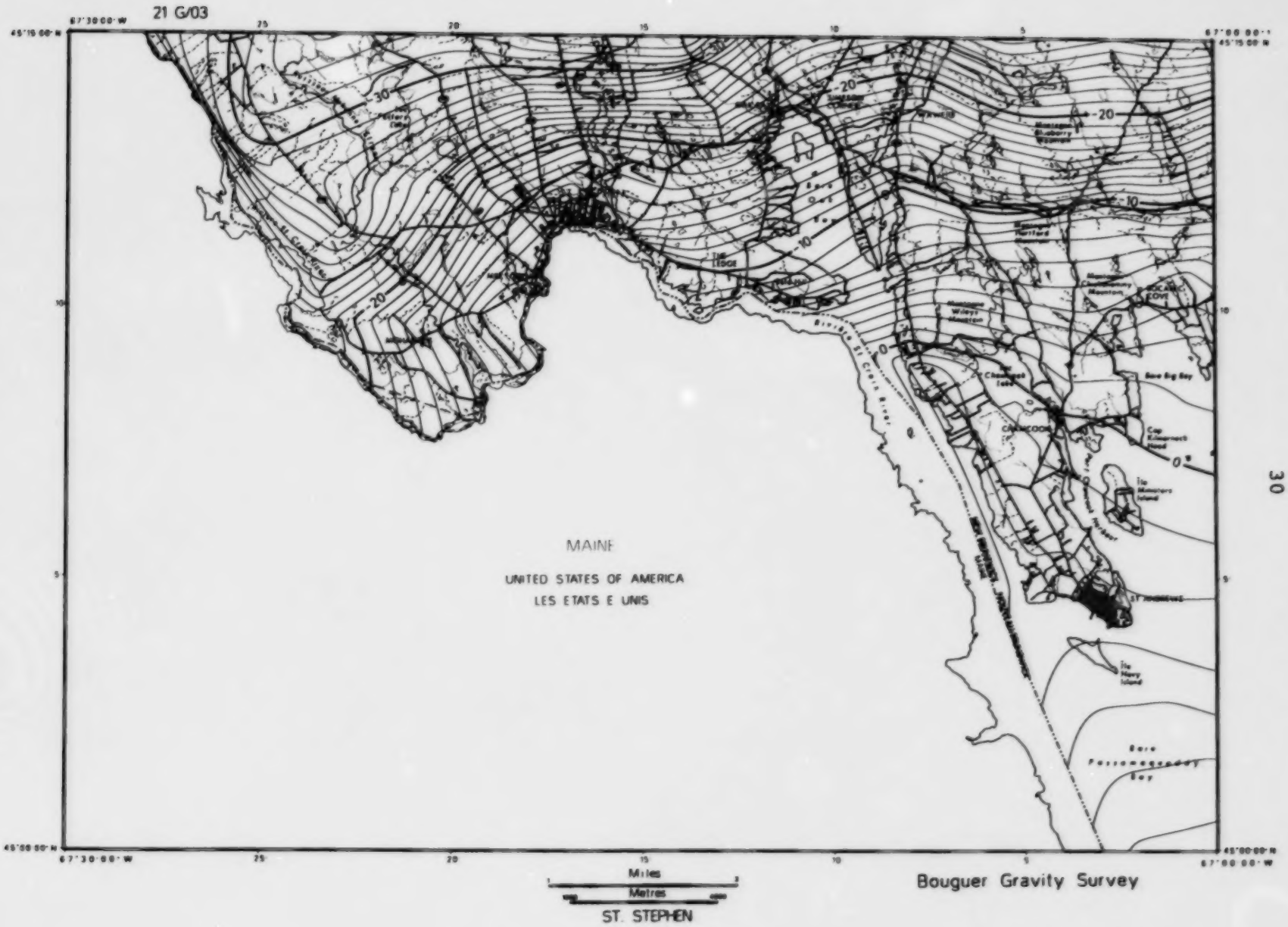


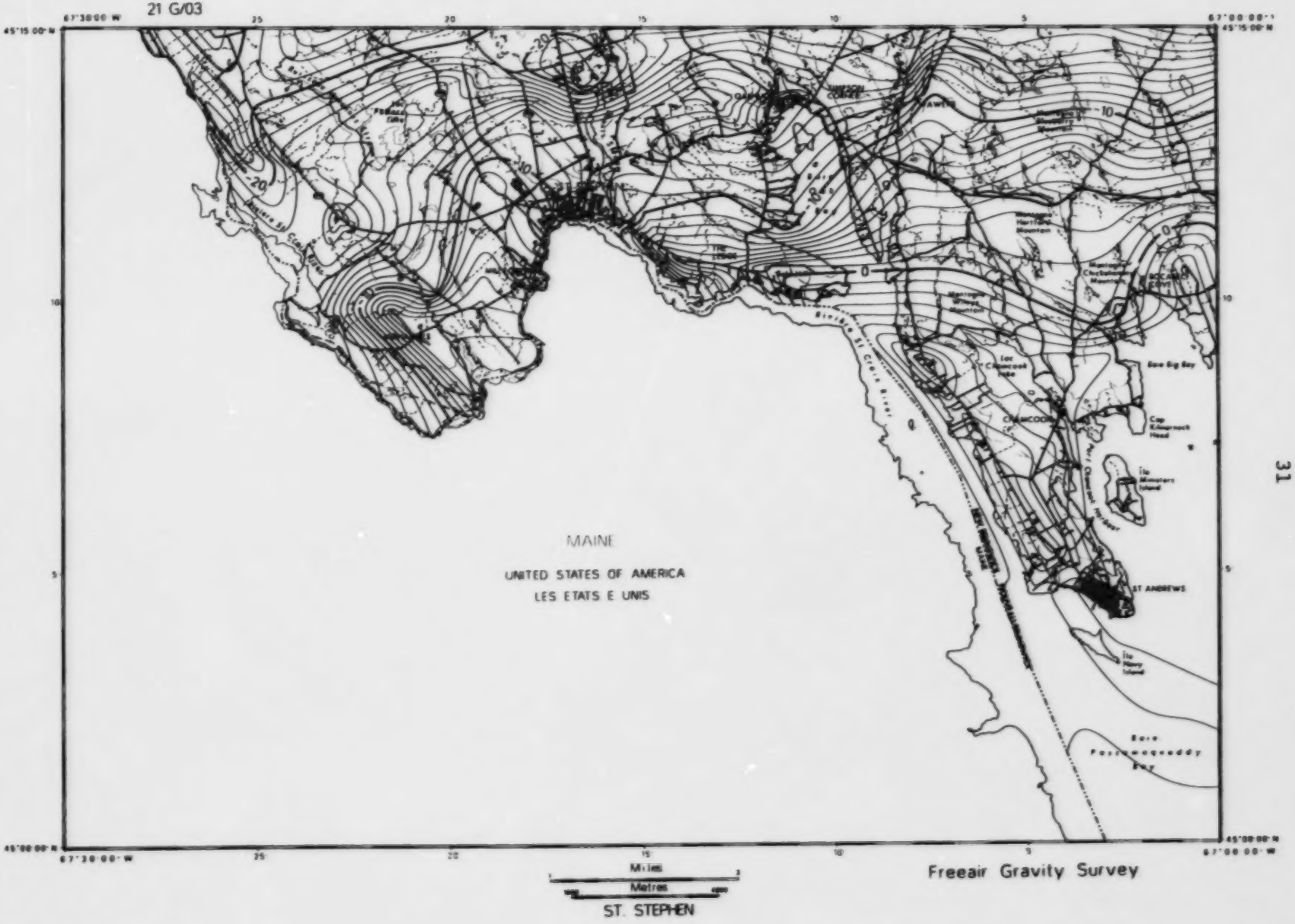
Bouguer Gravity Survey

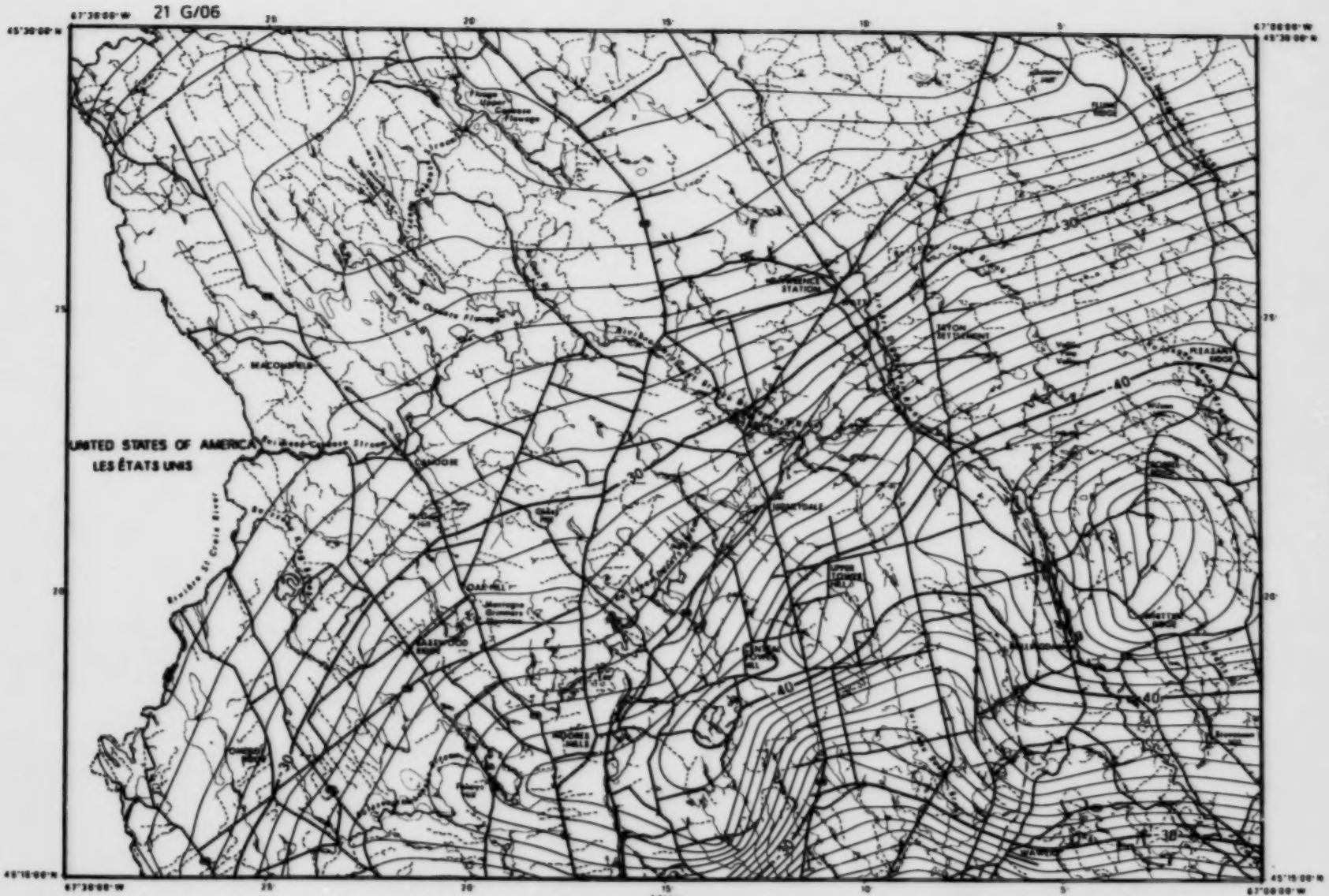

21 G/01
SAINT JOHN
BAY OF FUNDY
BAIE DE FUNDY
-10
0
10
-20
Miles
Metres
MUSQUASH
Freeair Gravity Survey

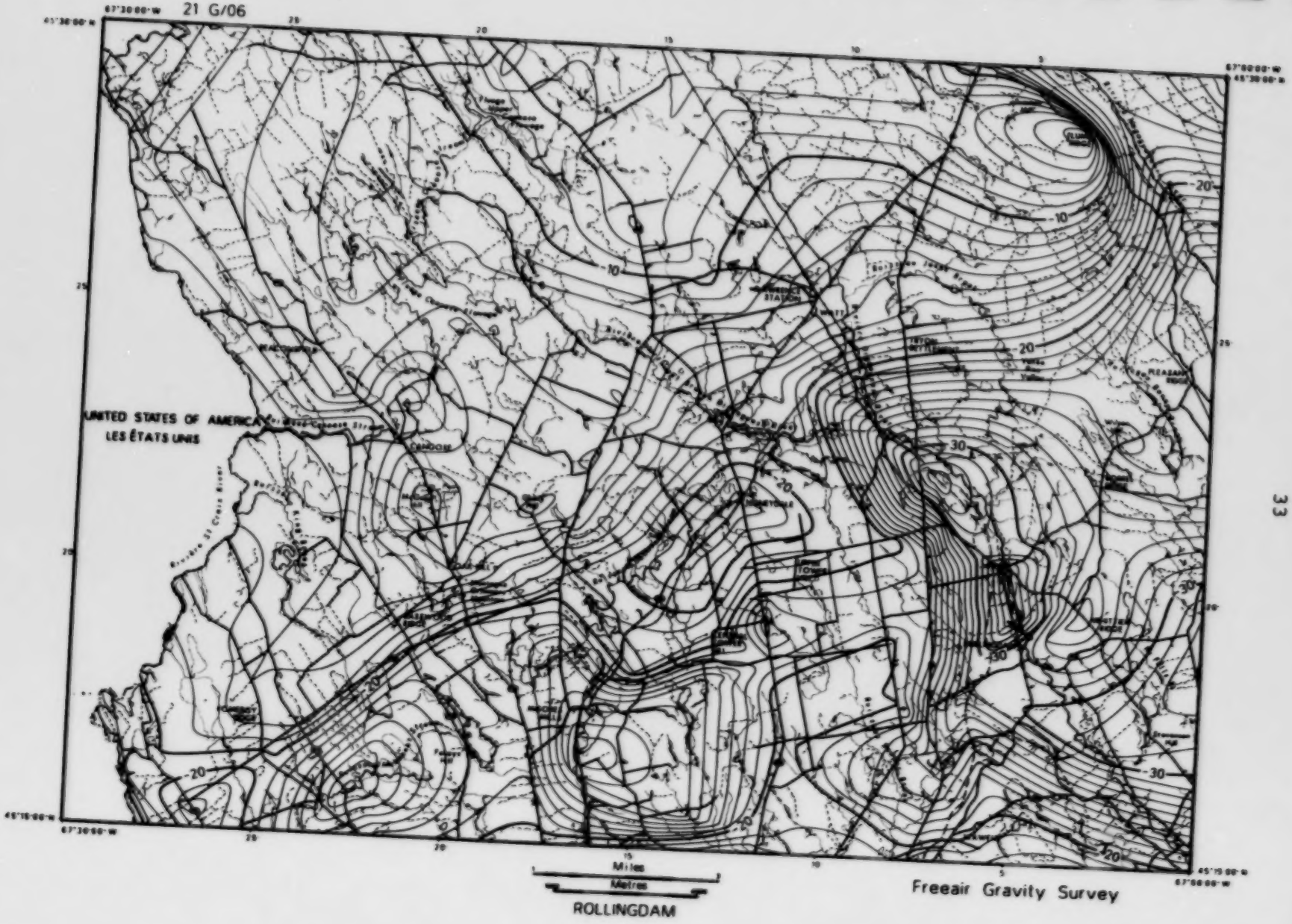

21 G/02
67°00'00"W
66°30'00"W
45°15'00"N
45°00'00"N
-30
-20
-10
0
10
20
30
KEREAU RIVER
Baie Passamaquoddy Bay
Baie Maces Bay
BAY OF FUNDY
BAIE DE FUNDY
Baie Back Bay
ST GEORGE
POCOLOGAN
Miles
Metres
ST. GEORGE
Bouguer Gravity Survey

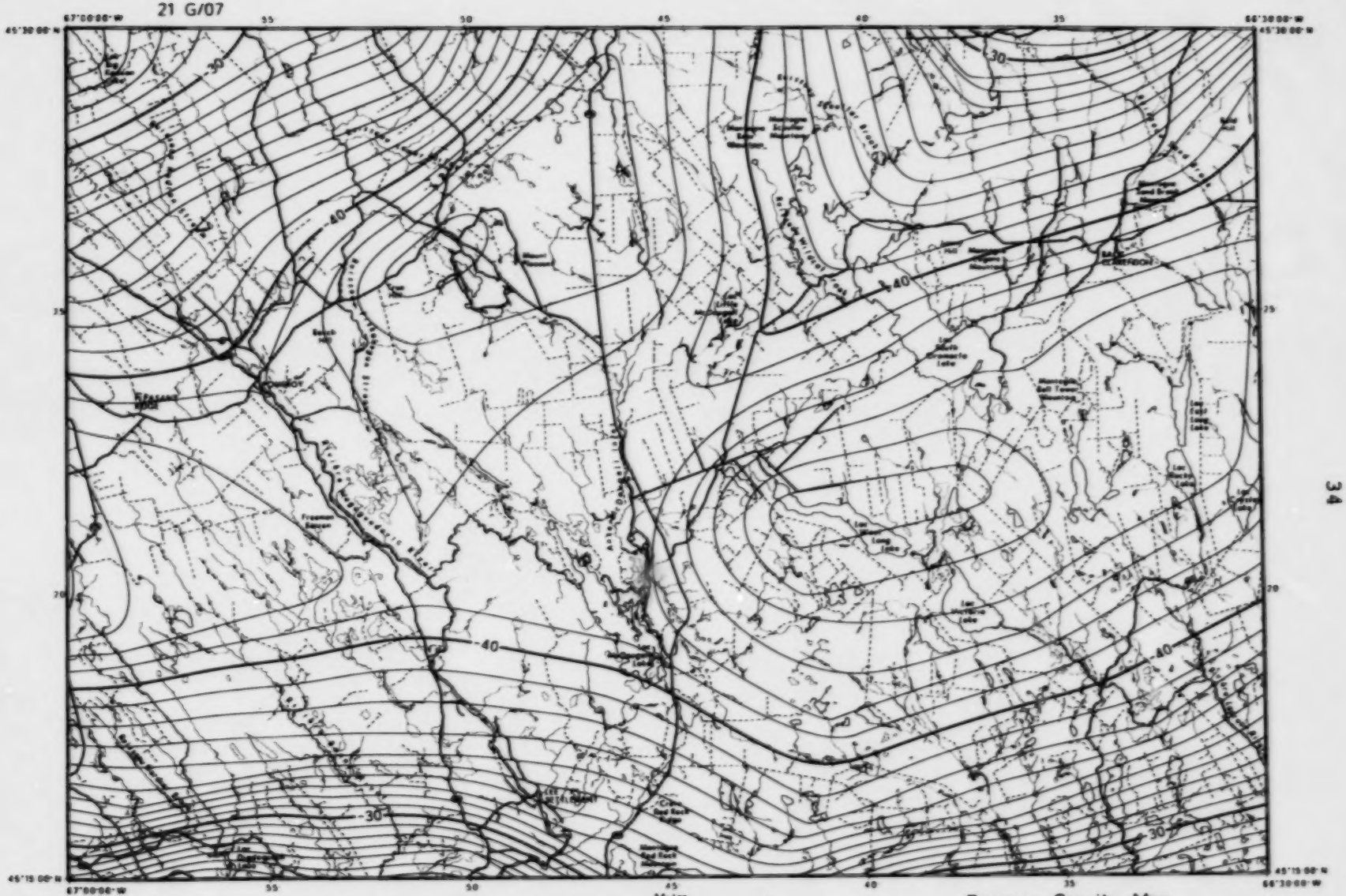

21 G/02
67°00'00" W
45°15'00" N
66°30'00" W
45°00'00" N
ST GEORGE
UTOPIA
PENNFIELD
BEAVER HARBOUR
LETETE
LEWIS MILLS
Baie Passamaquoddy Bay
Passage Letete Passage
Bale-Back Bay
Ile Frye Island
POCOLOGAN
Baie Macs Bay
BAY OF FUNDY
BAIE DE FUNDY
-20
-10
0
10
Miles
Metres
ST GEORGE
Freeair Gravity Survey


21 G/03
MAINE
UNITED STATES OF AMERICA
LES ETATS E UNIS
Miles
Metres
ST. STEPHEN
Bouguer Gravity Survey


21 G/03
MAINE
UNITED STATES OF AMERICA
LES ETATS E UNIS
ST ANDREWS
Miles
Metres
ST. STEPHEN
Freeair Gravity Survey

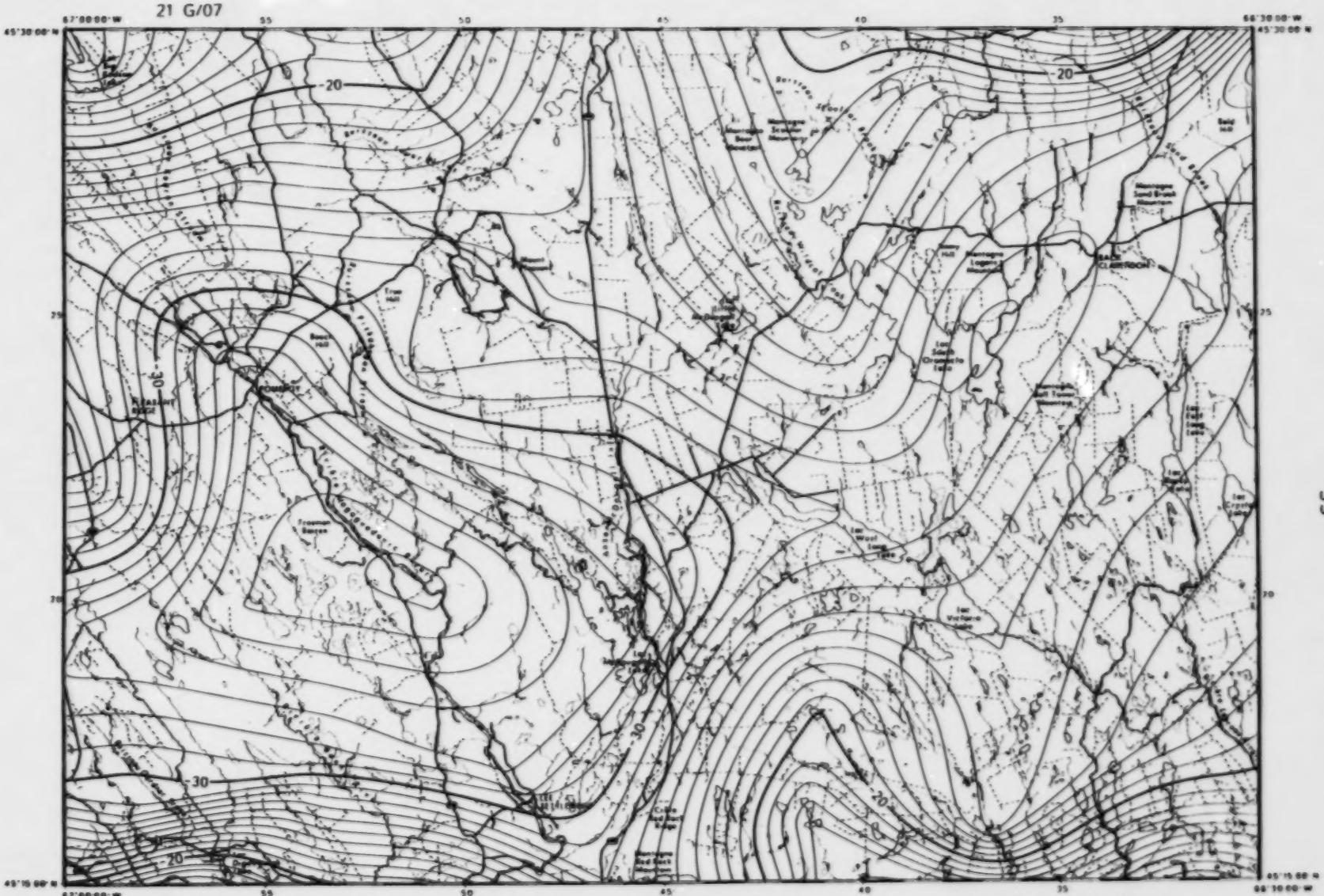

21 G/06
UNITED STATES OF AMERICA
LES ÉTATS UNIS
Miles
Metres
ROLLINGDAM
Bouguer Gravity Survey

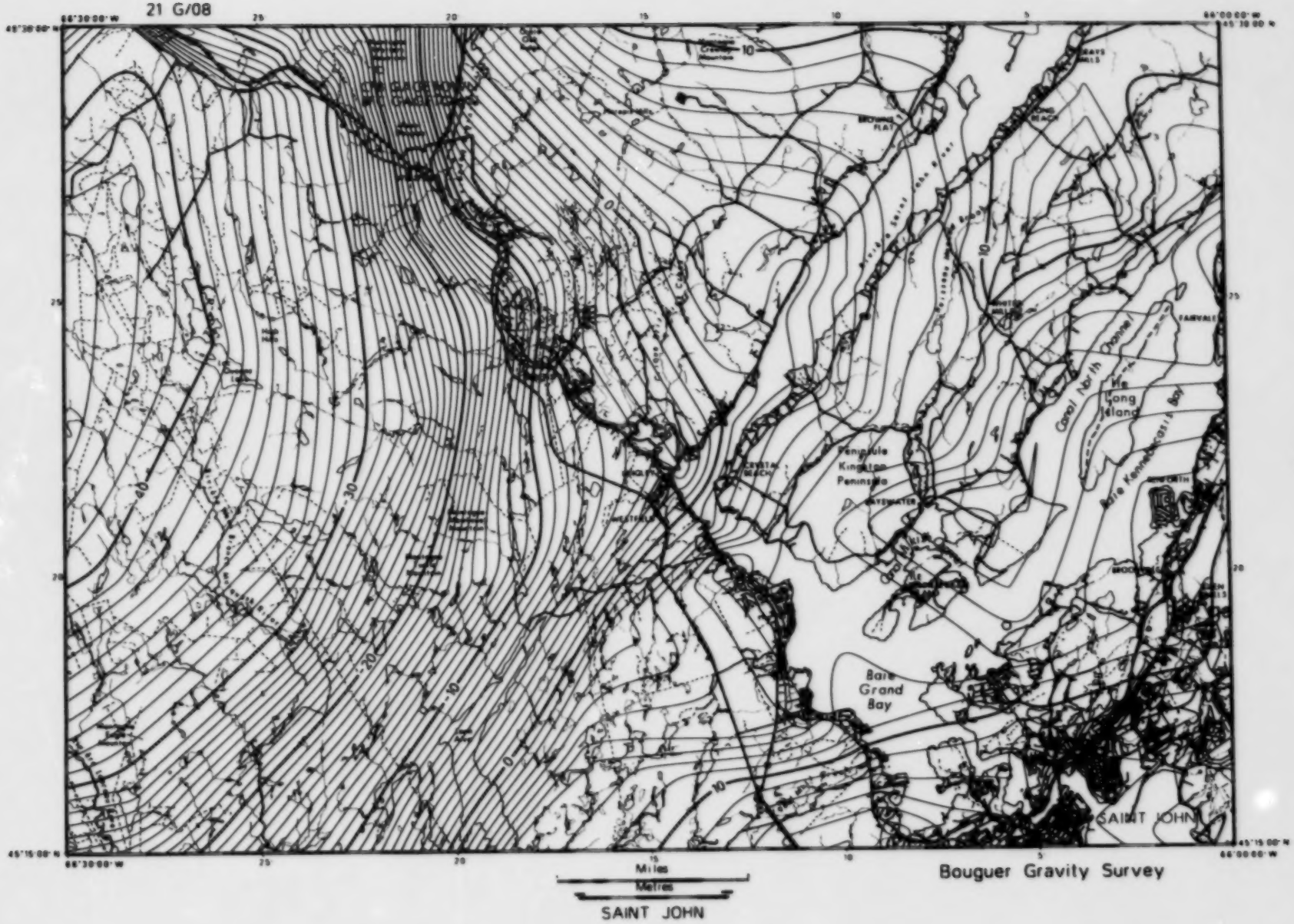

21 G/06
UNITED STATES OF AMERICA
LES ÉTATS UNIS
Miles
Metres
ROLLINGDAM
Freeair Gravity Survey

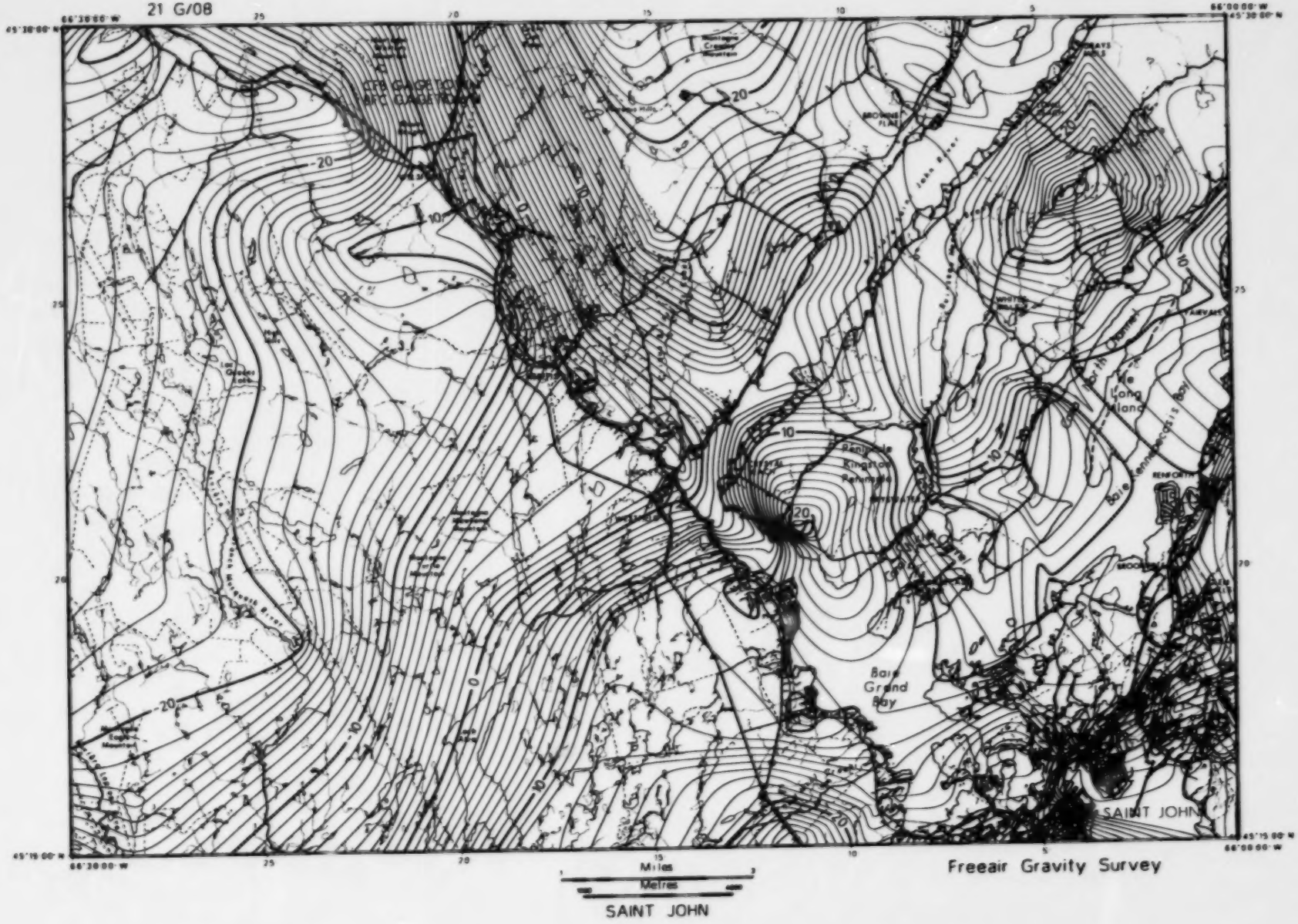


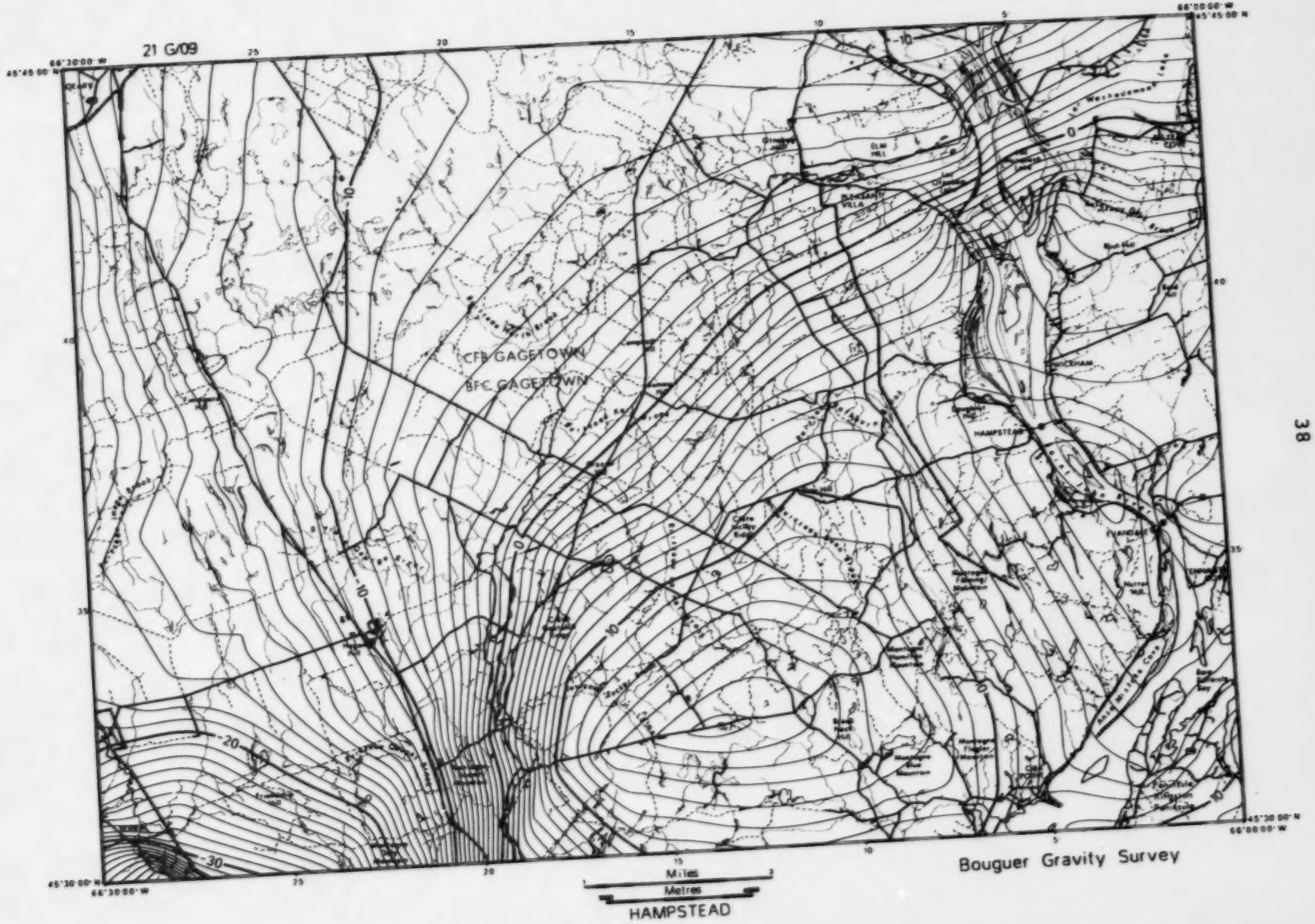
Bouguer Gravity Map

McDOUGALL LAKE

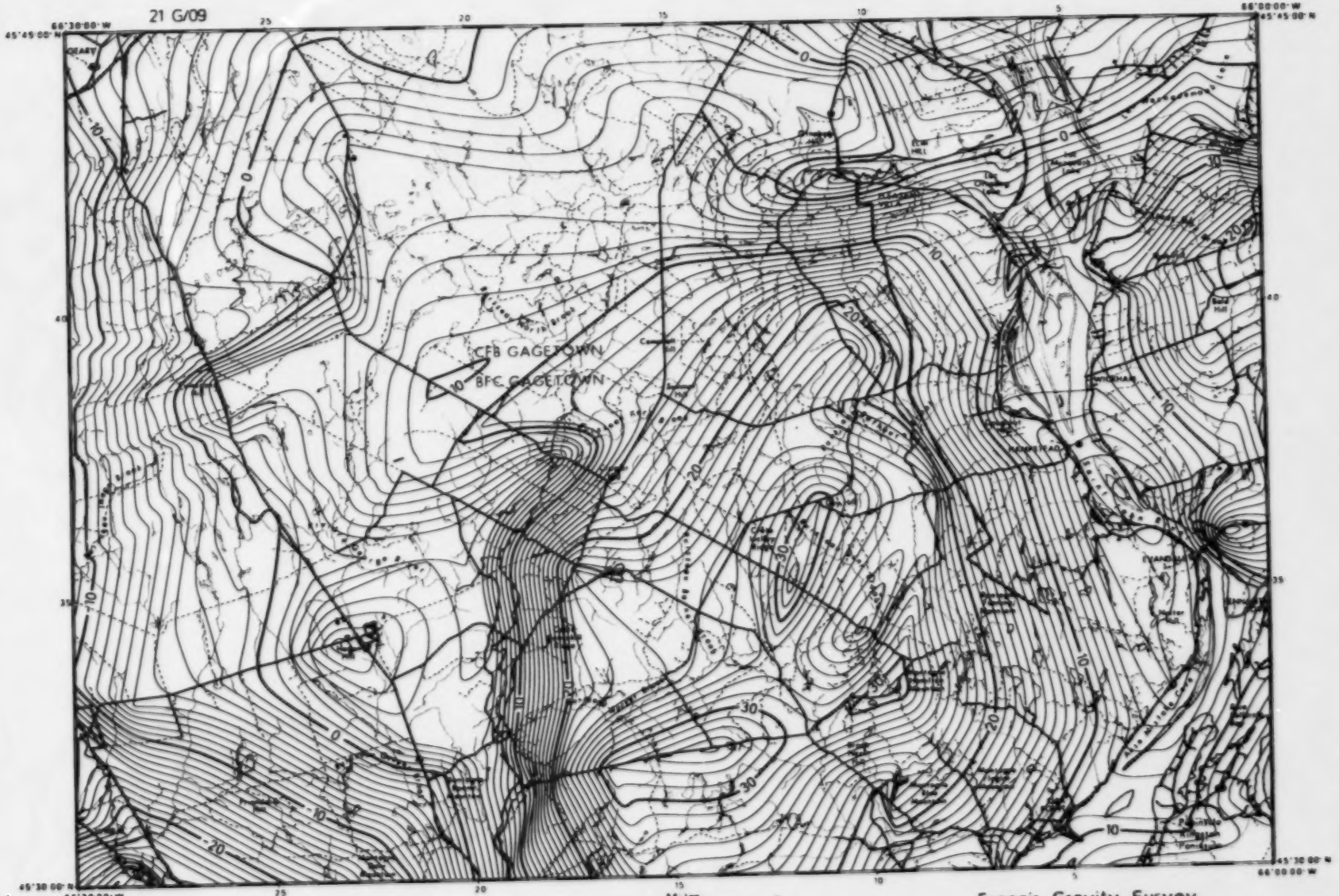

21 G/07
-20
-30
Miles
Metres
McDOUGALL LAKE
Freeair Gravity Survey

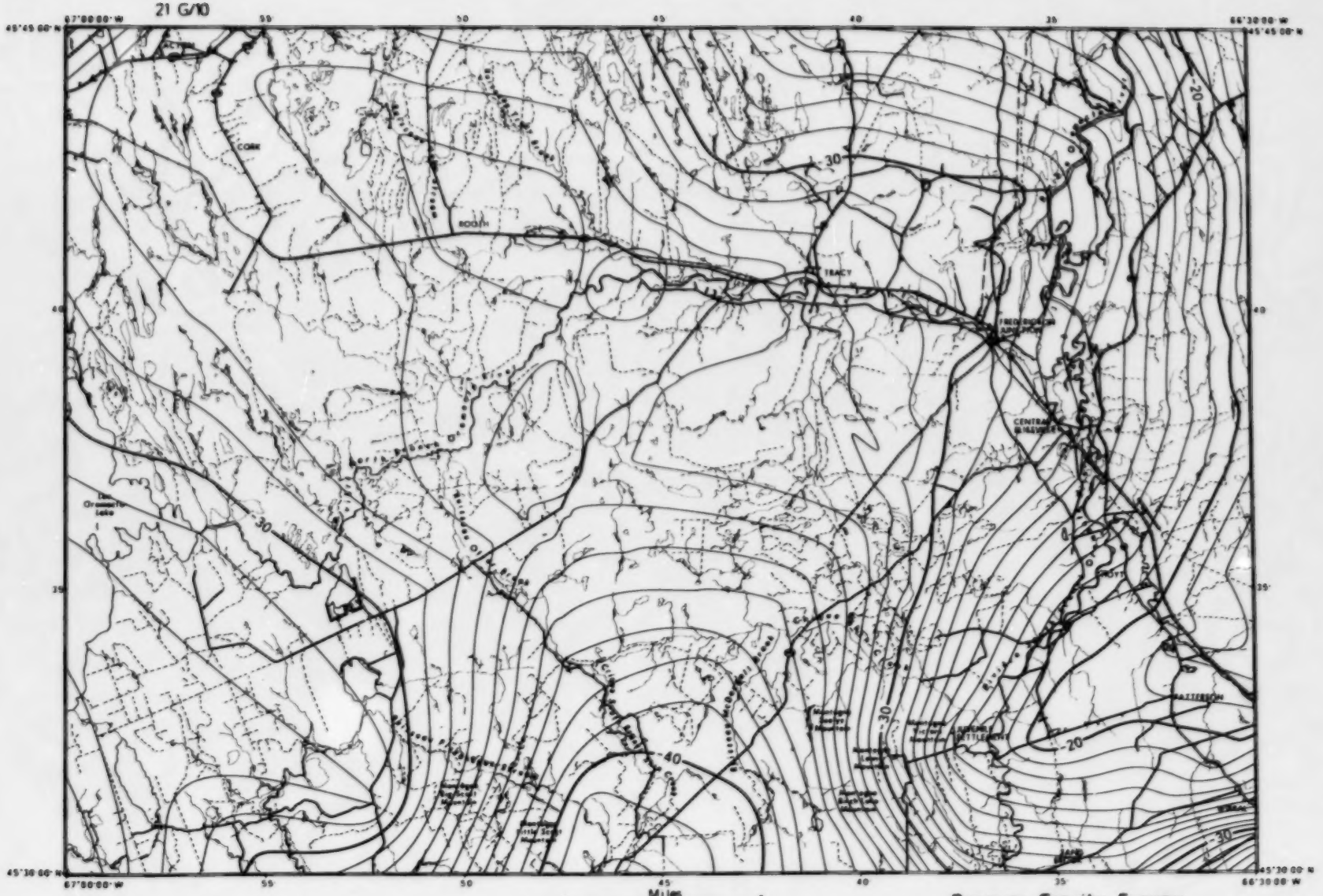

21 G/08
66°30'00"W
66°00'00"W
45°30'00"N
45°15'00"N
25
20
15
10
5
Grand Manan
Brunswick Flat
Mays Mills
Mace's Head
Fairvale
Grand North Bay
Mc Long Island
Kennebecasis Bay
Peninsula
Kingston Peninsula
Belyea's Beach
Hatfield
Mt Pleasant
Mt Hebron
Bay Shore
Bay Side
Bay Grand Bay
SAINT JOHN
Miles
Metres
SAINT JOHN
Bouguer Gravity Survey


21 G/08
Bay
Grand
Bay
SAINT JOHN
Miles
Metres
SAINT JOHN
Freeair Gravity Survey



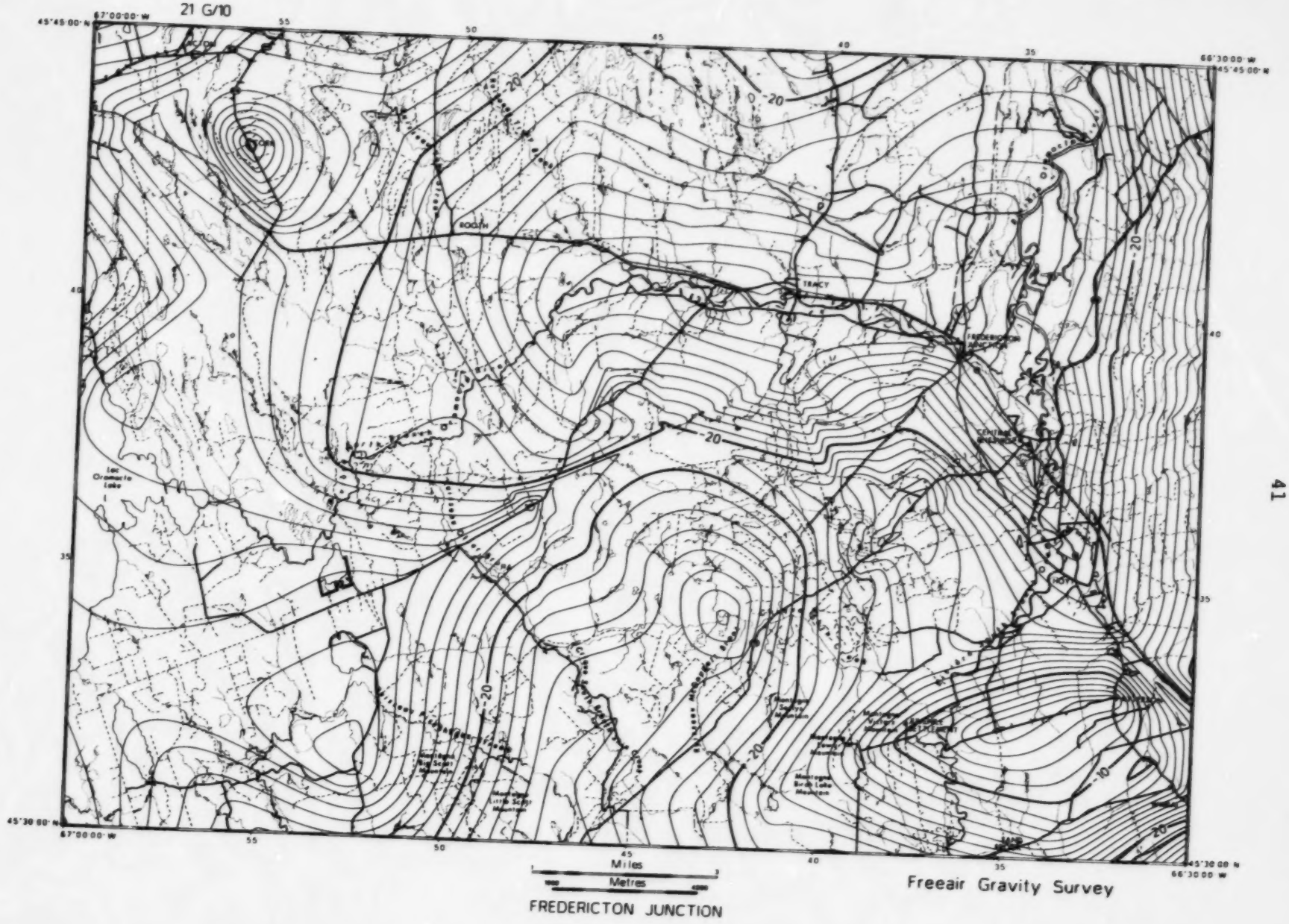
Bouguer Gravity Survey

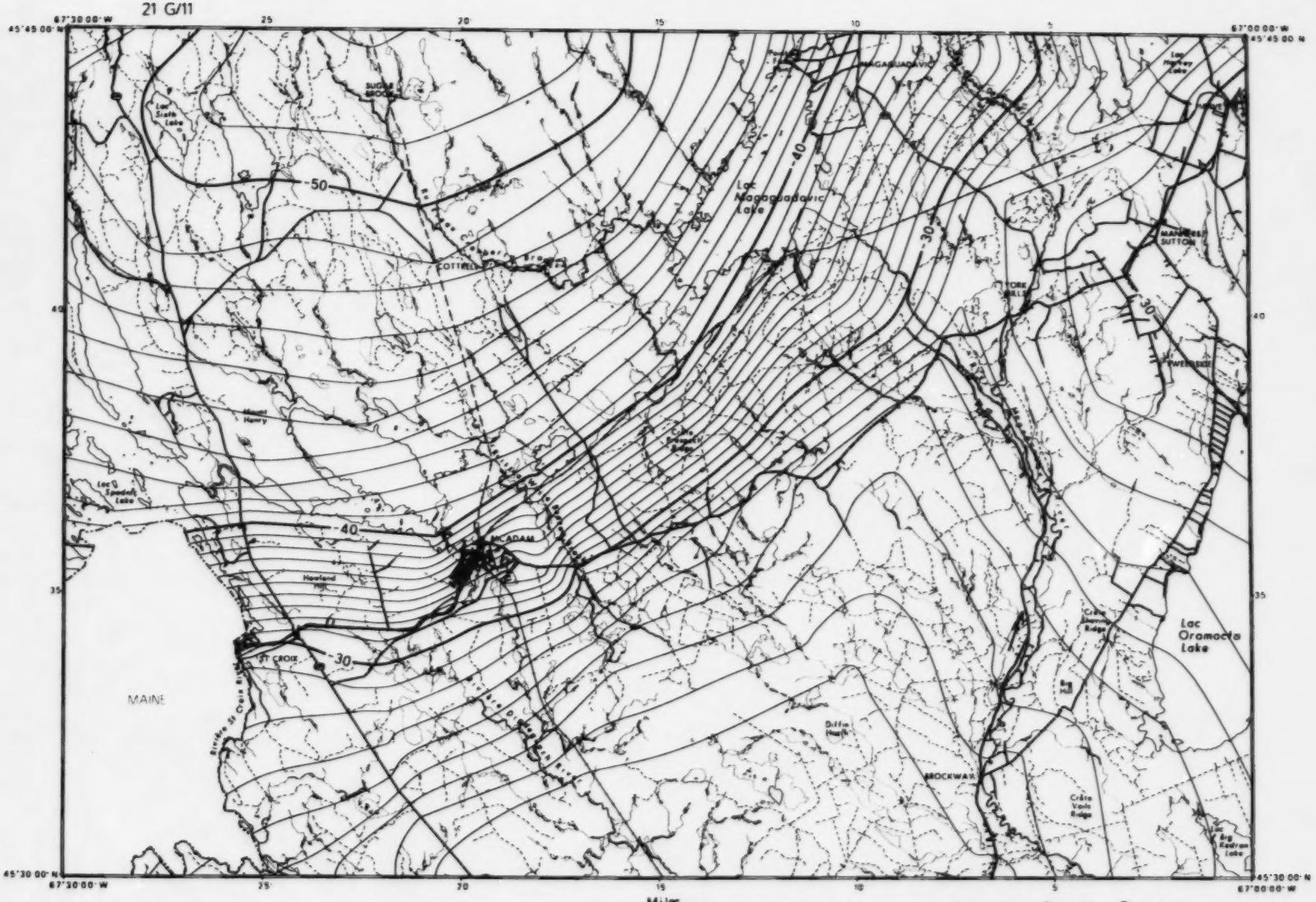

21 G/09
CFB GAGETOWN
BFC GAGETOWN
Miles
Metres
HAMPSTEAD
Freeair Gravity Survey



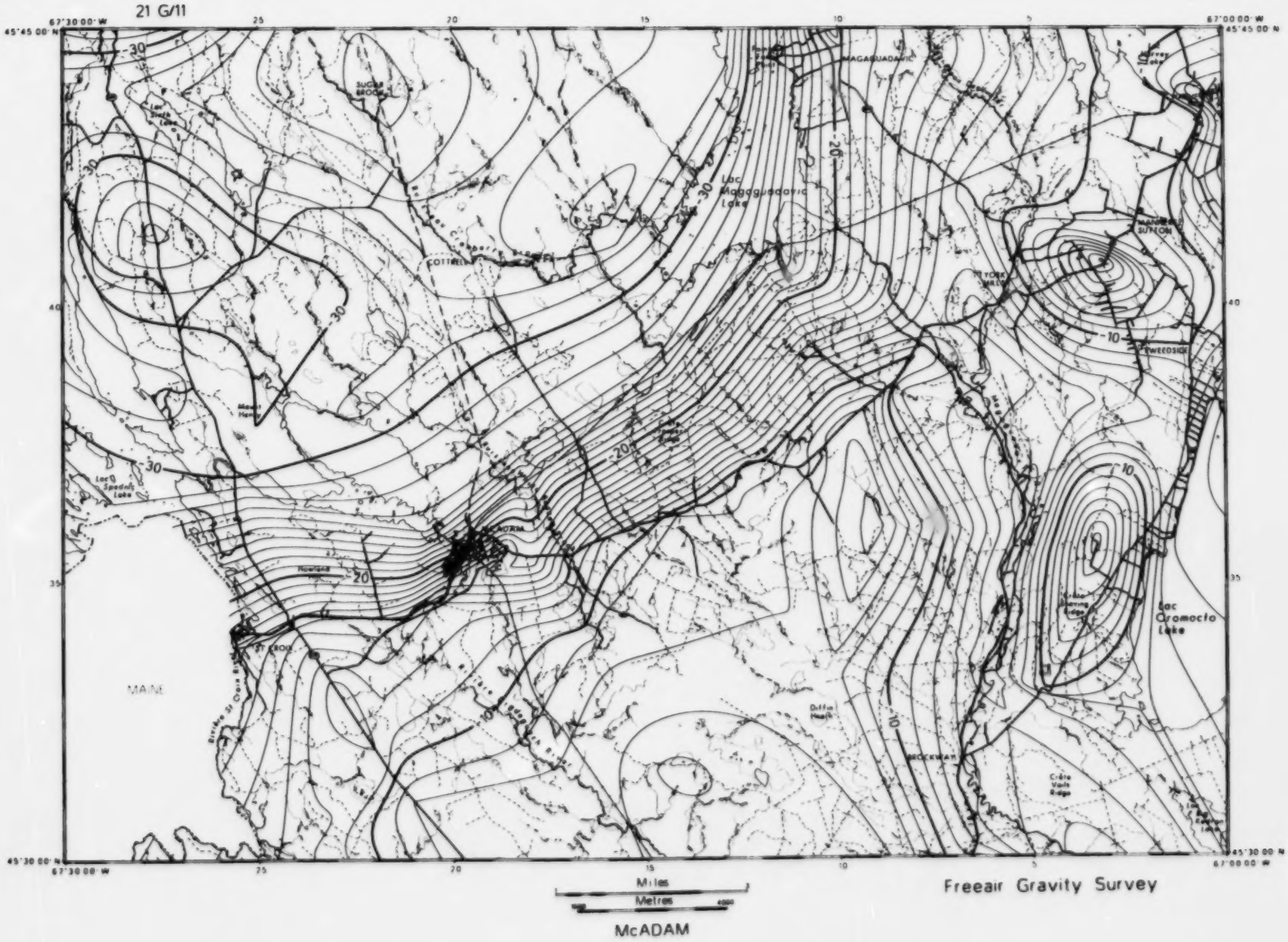
Bouguer Gravity Survey

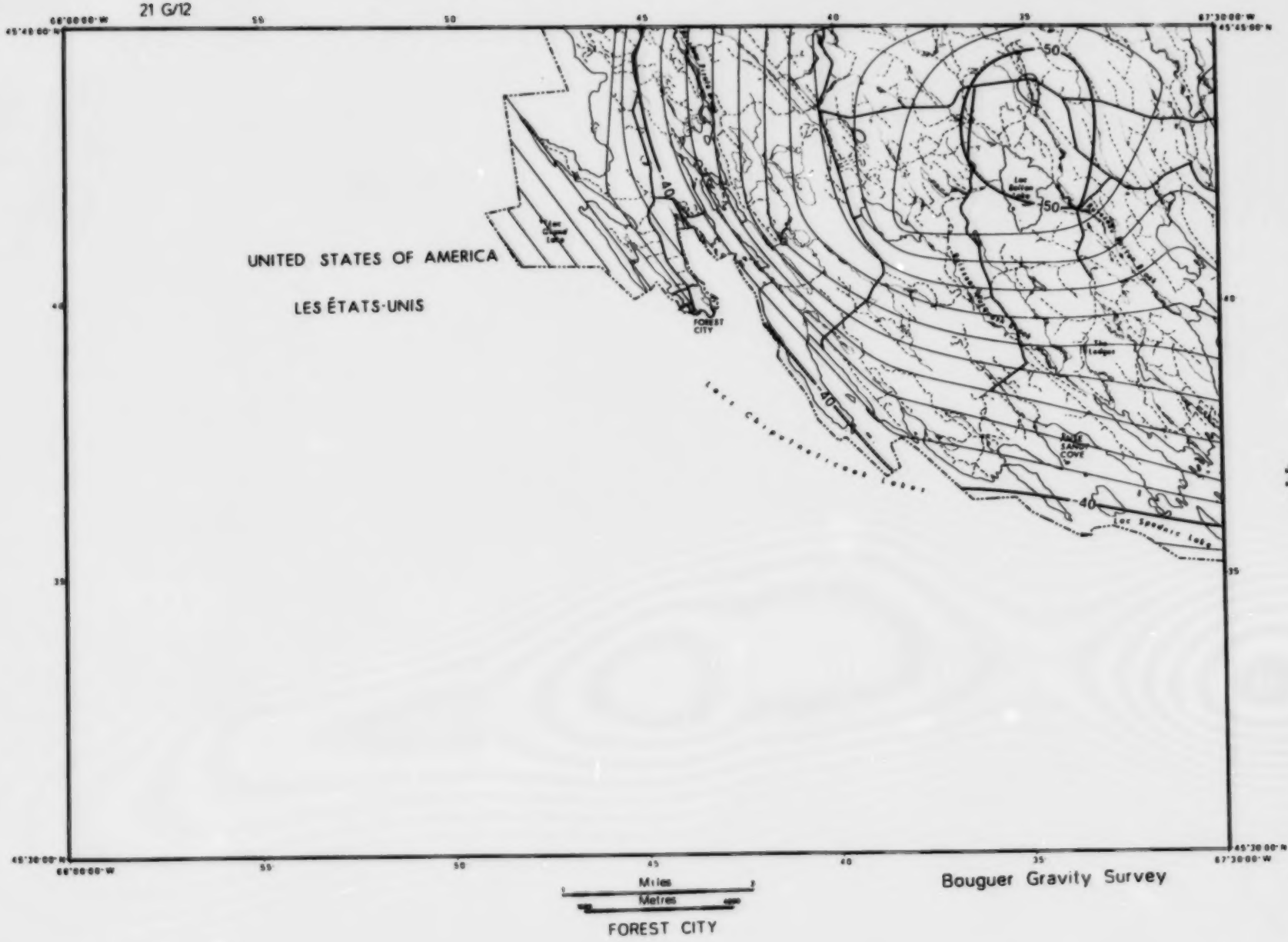
FREDERICTON JUNCTION

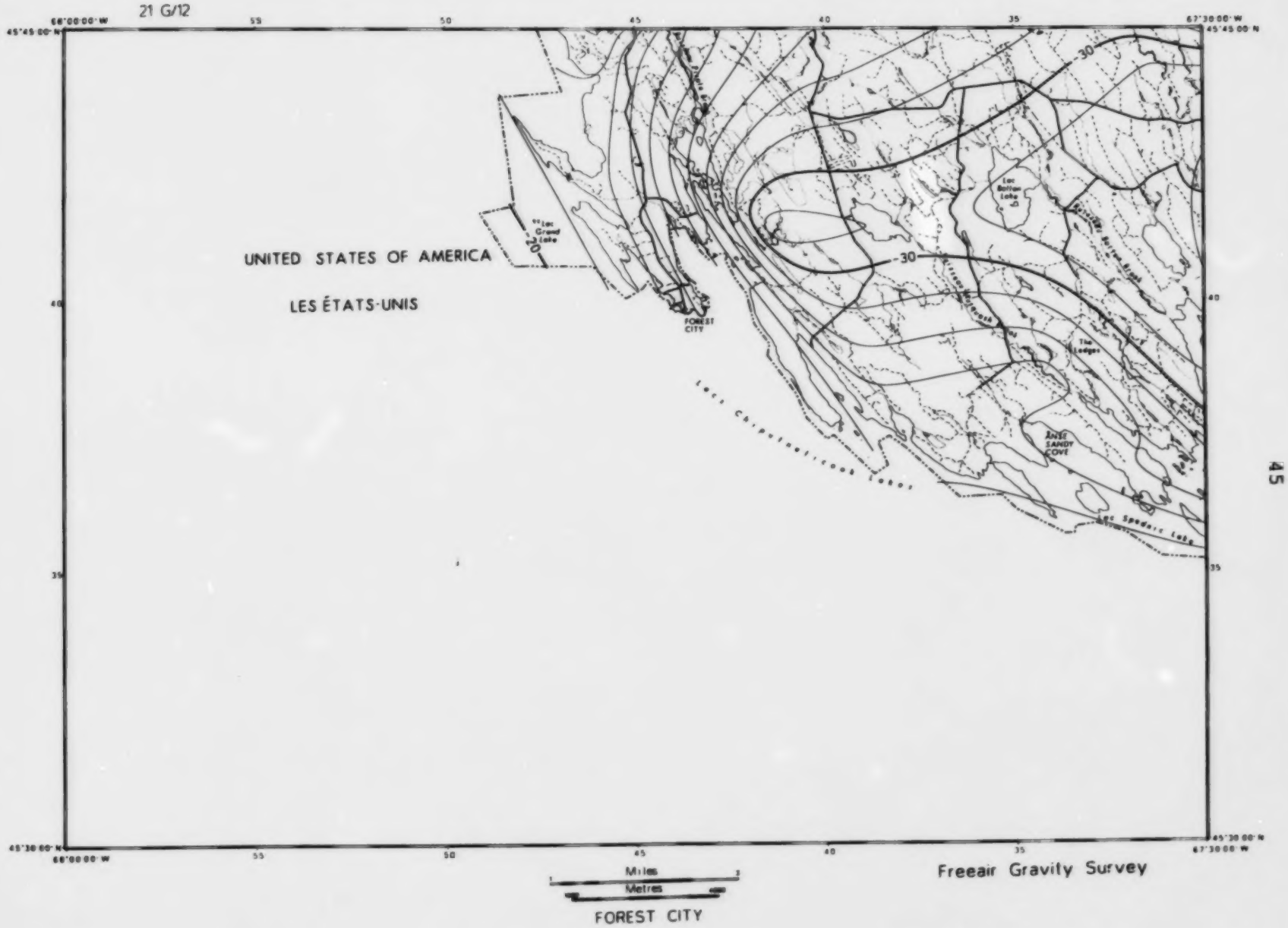

21 G/10
67°00'00" W
45°45'00" N
66°30'00" W
45°30'00" N
55
50
45
40
35
-20
-10
0
20
ROOTH
TRACY
Lac Oromocto Lake
Miles
Metres
Freeair Gravity Survey
FREDERICTON JUNCTION



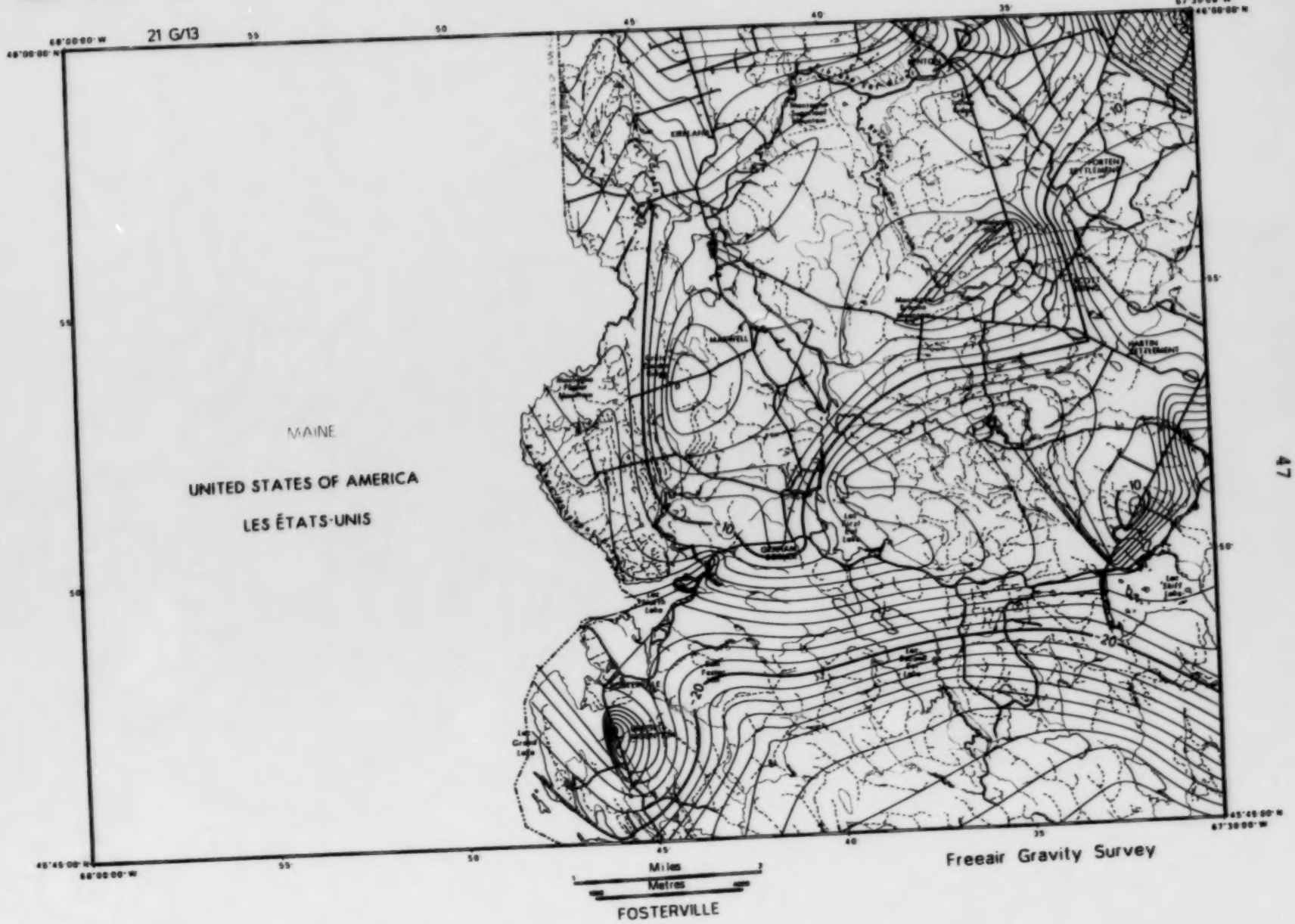
Bouguer Gravity Survey


21 G/11
67°30'00" W
67°00'00" W
45°45'00" N
45°30'00" N
25
20
15
10
5
40
35
30
20
10
MAINE
Lac Mégaguadavic Lake
Lac Gramocto Lake
Miles
Metres
McADAM
Freeair Gravity Survey

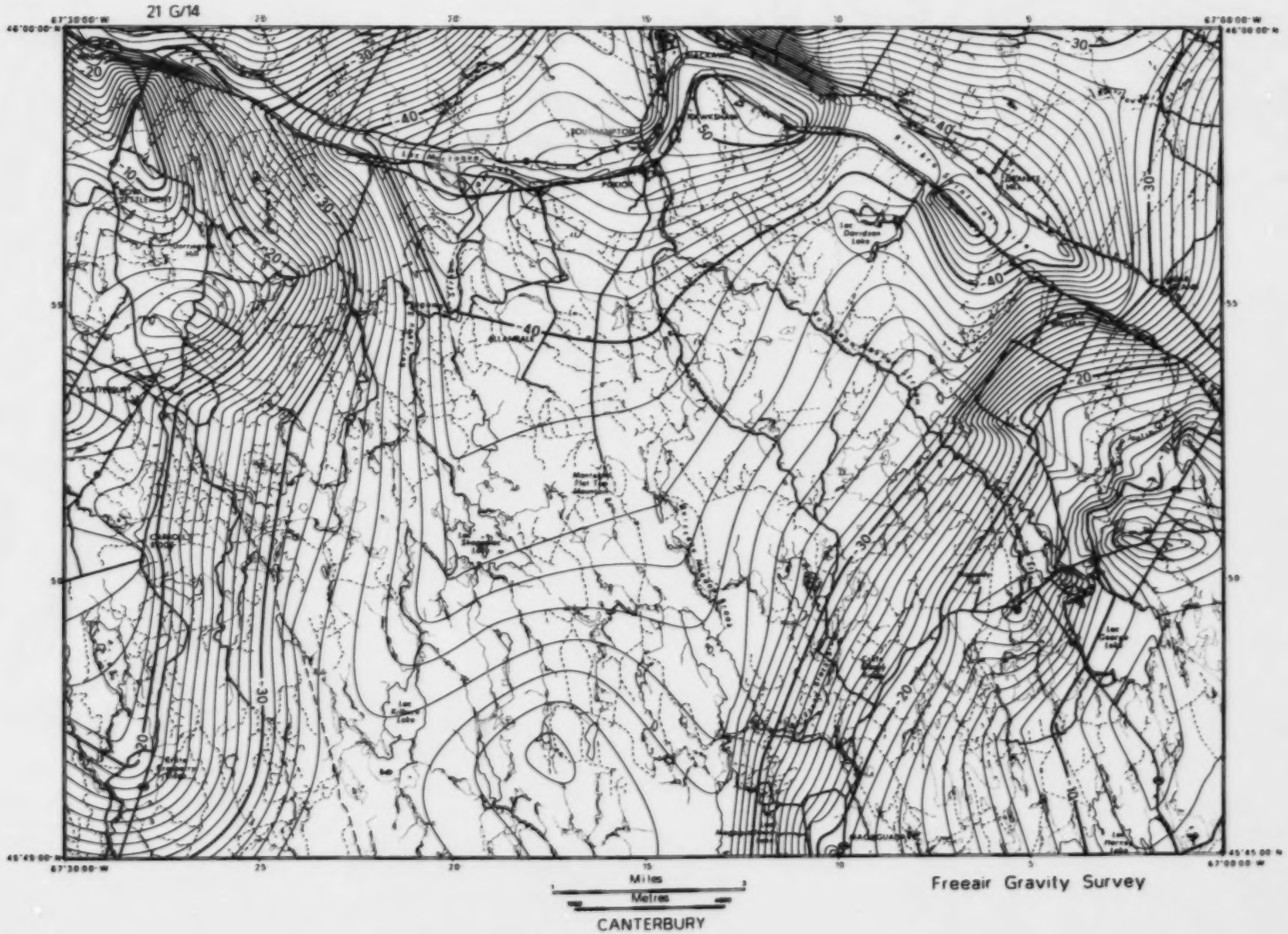

UNITED STATES OF AMERICA
LES ÉTATS-UNIS
-40
-50
FOREST CITY
Miles
Metres
FOREST CITY
Bouguer Gravity Survey

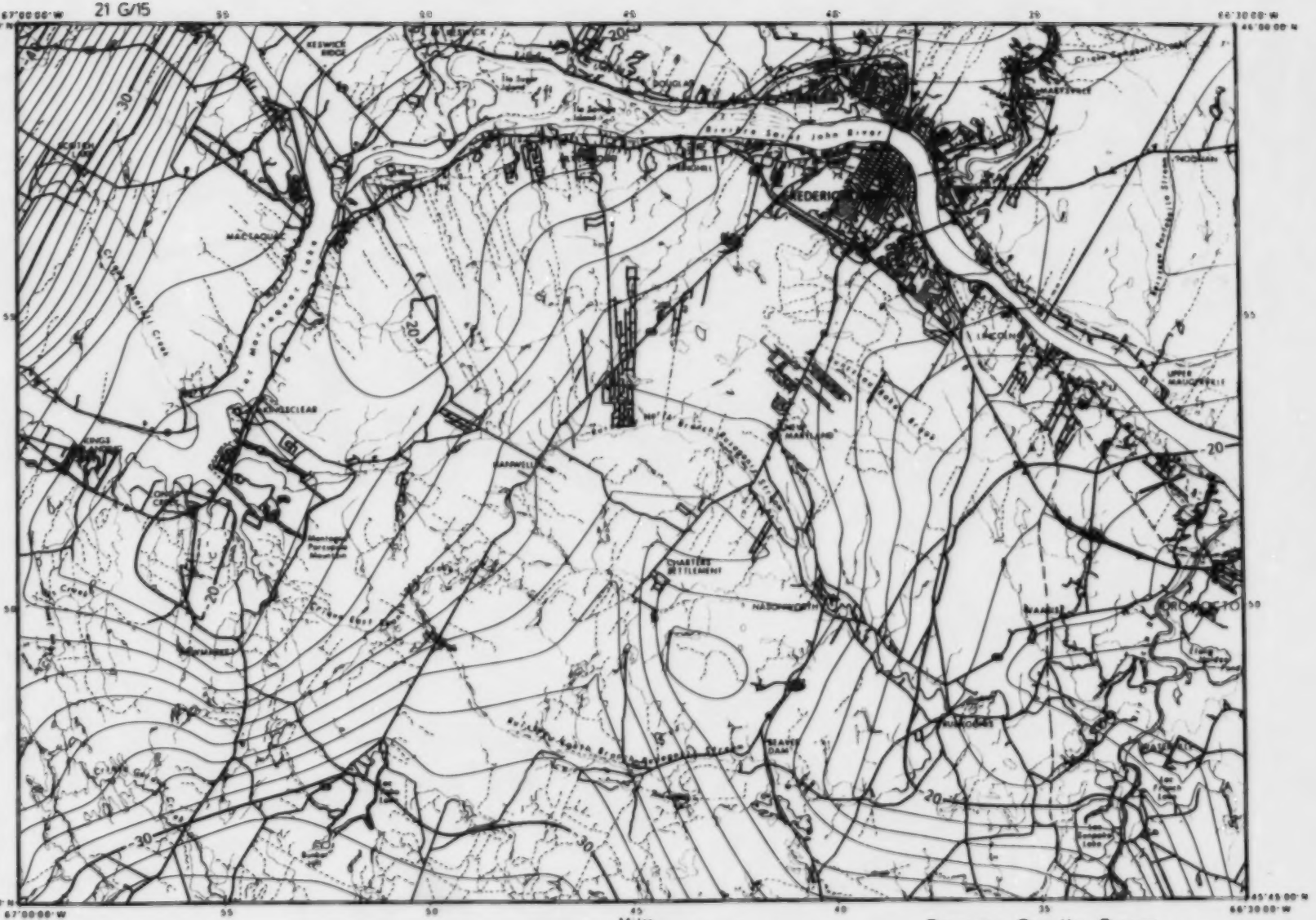

21 G/12
68°00'00" W
67°30'00" W
45°45'00" N
45°30'00" N
55
50
45
40
35
UNITED STATES OF AMERICA
LES ÉTATS-UNIS
FOREST CITY
Lac Chipoteatticook
Lac Speckle
Miles
Metres
FOREST CITY
Freeair Gravity Survey
45

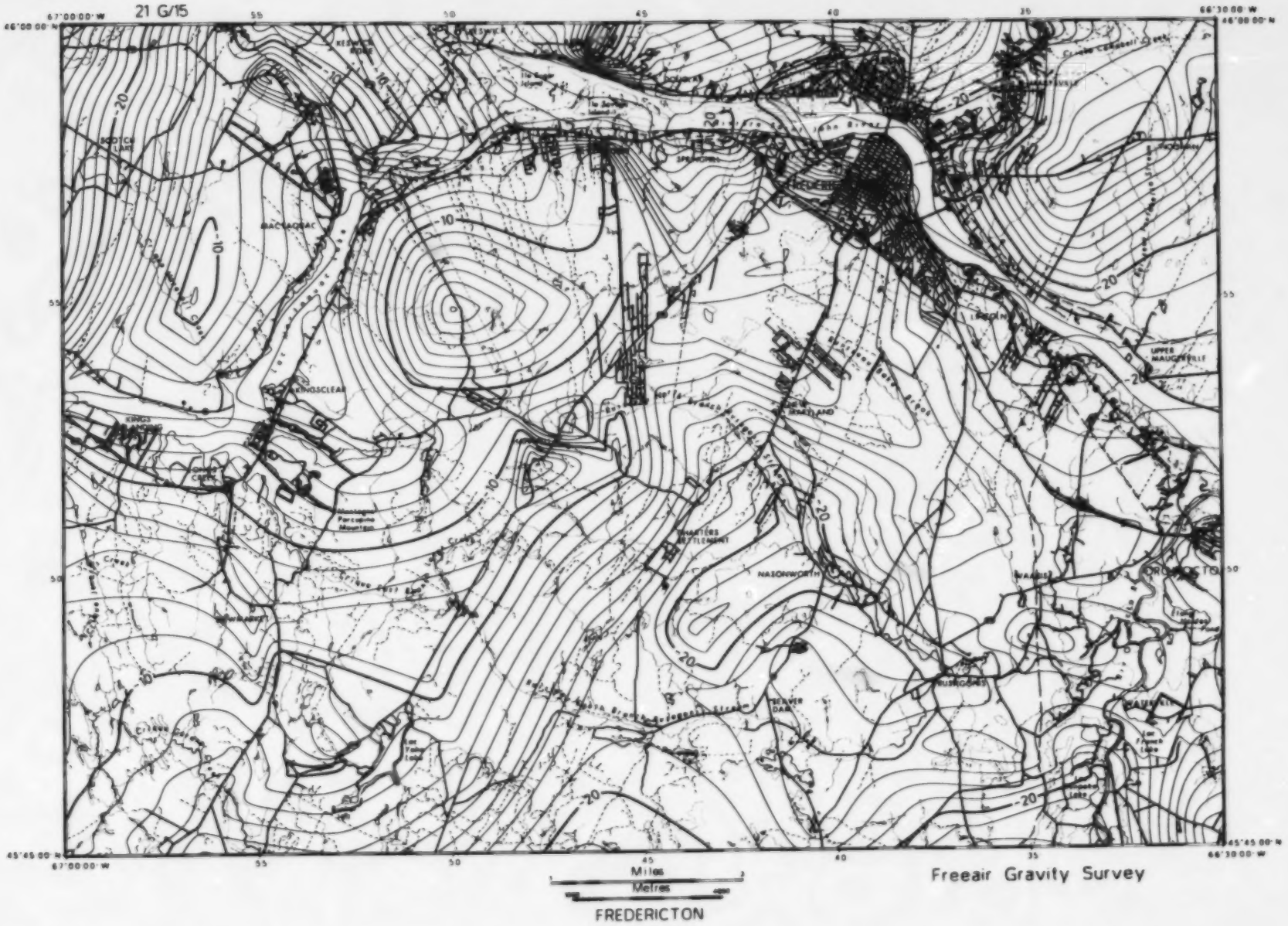

MAINE
UNITED STATES OF AMERICA
LES ÉTATS-UNIS
Miles
Metres
FOSTERVILLE
Bouguer Gravity Survey

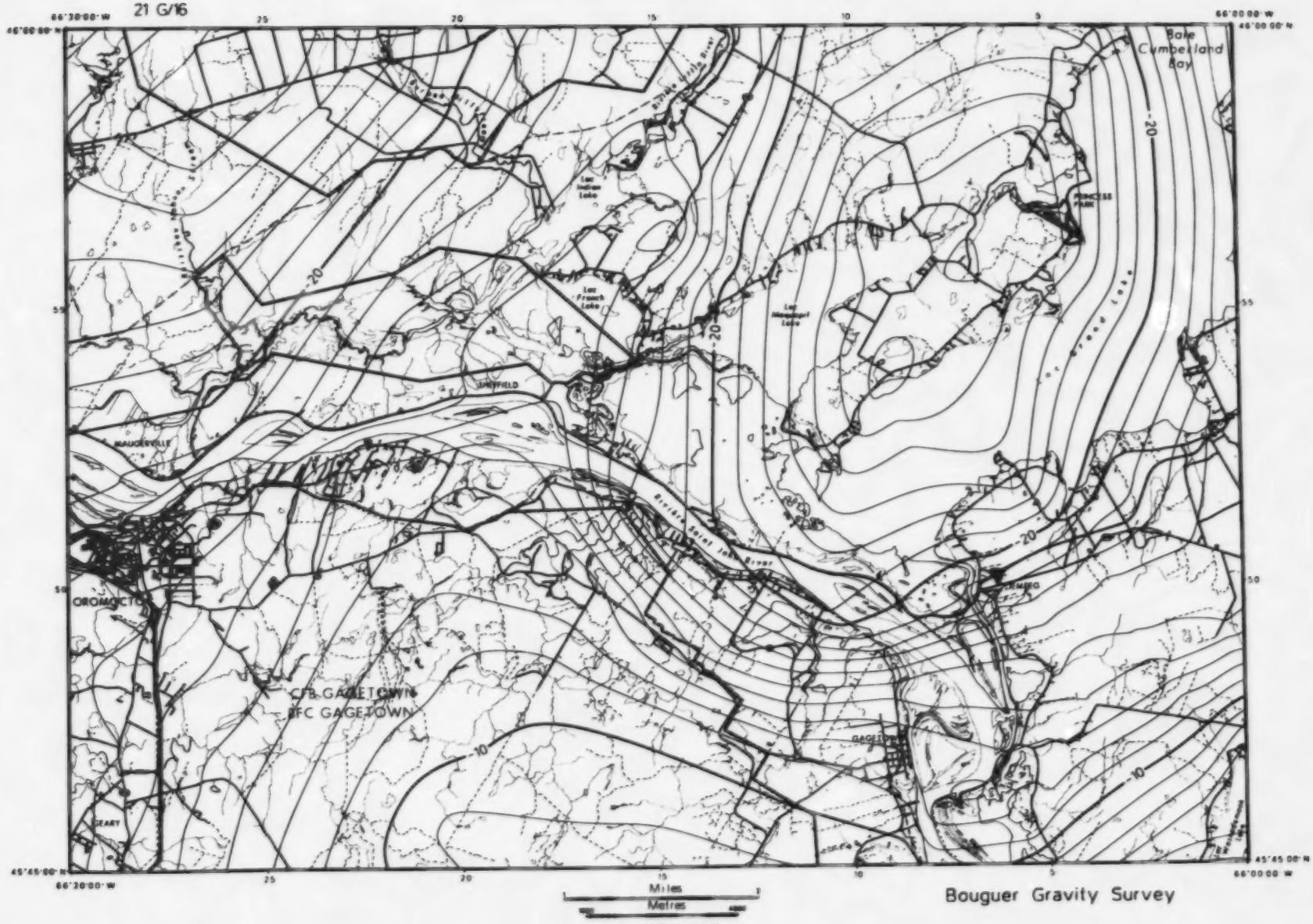

21 G/13
MAINE
UNITED STATES OF AMERICA
LES ÉTATS-UNIS
Miles
Metres
FOSTERVILLE
Freeair Gravity Survey

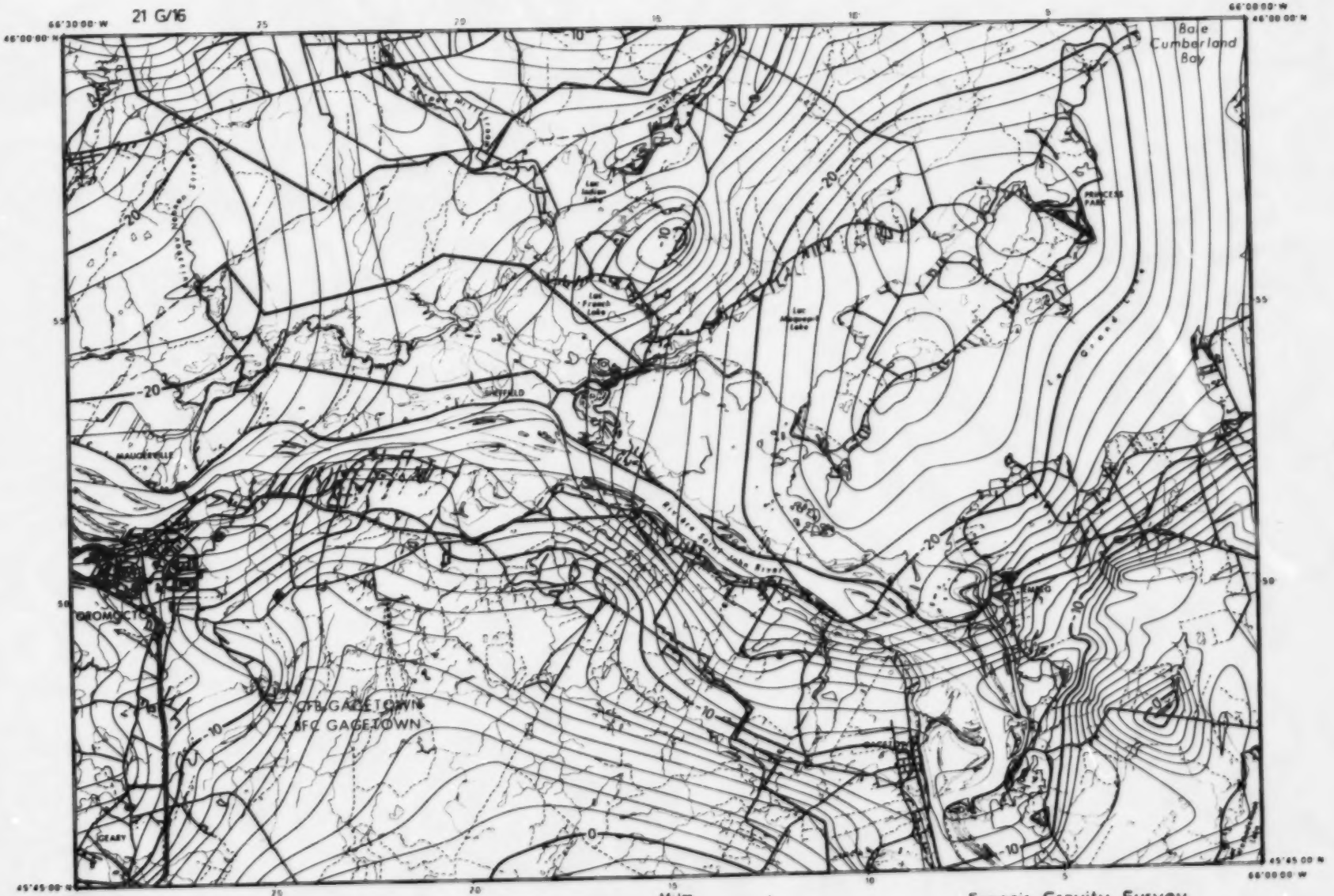
Bouguer Gravity Survey

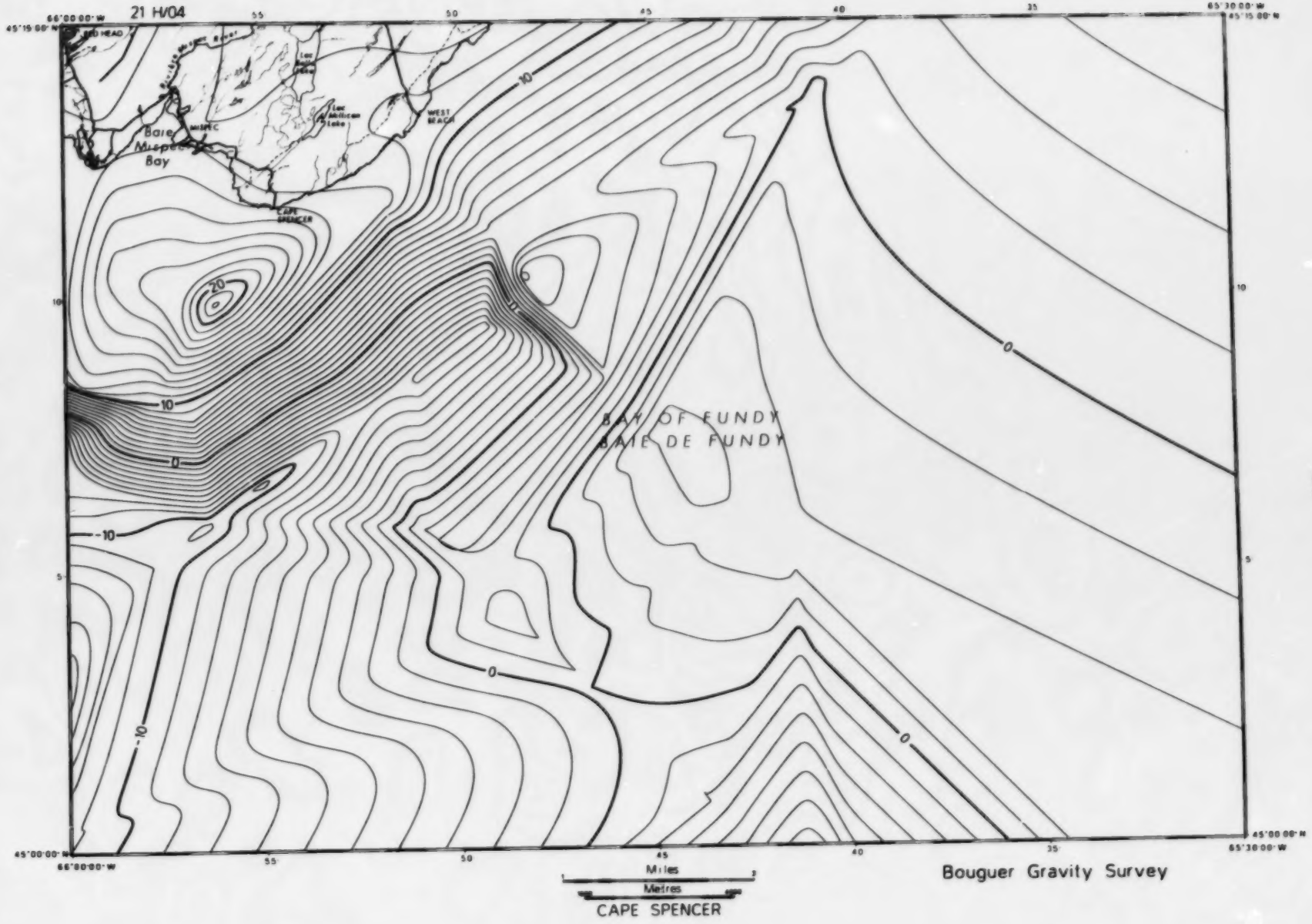

21 G/14
Miles
Metres
CANTERBURY
Freeair Gravity Survey


21 G/15
FREDERICTON
Miles
Metres
Bouguer Gravity Survey

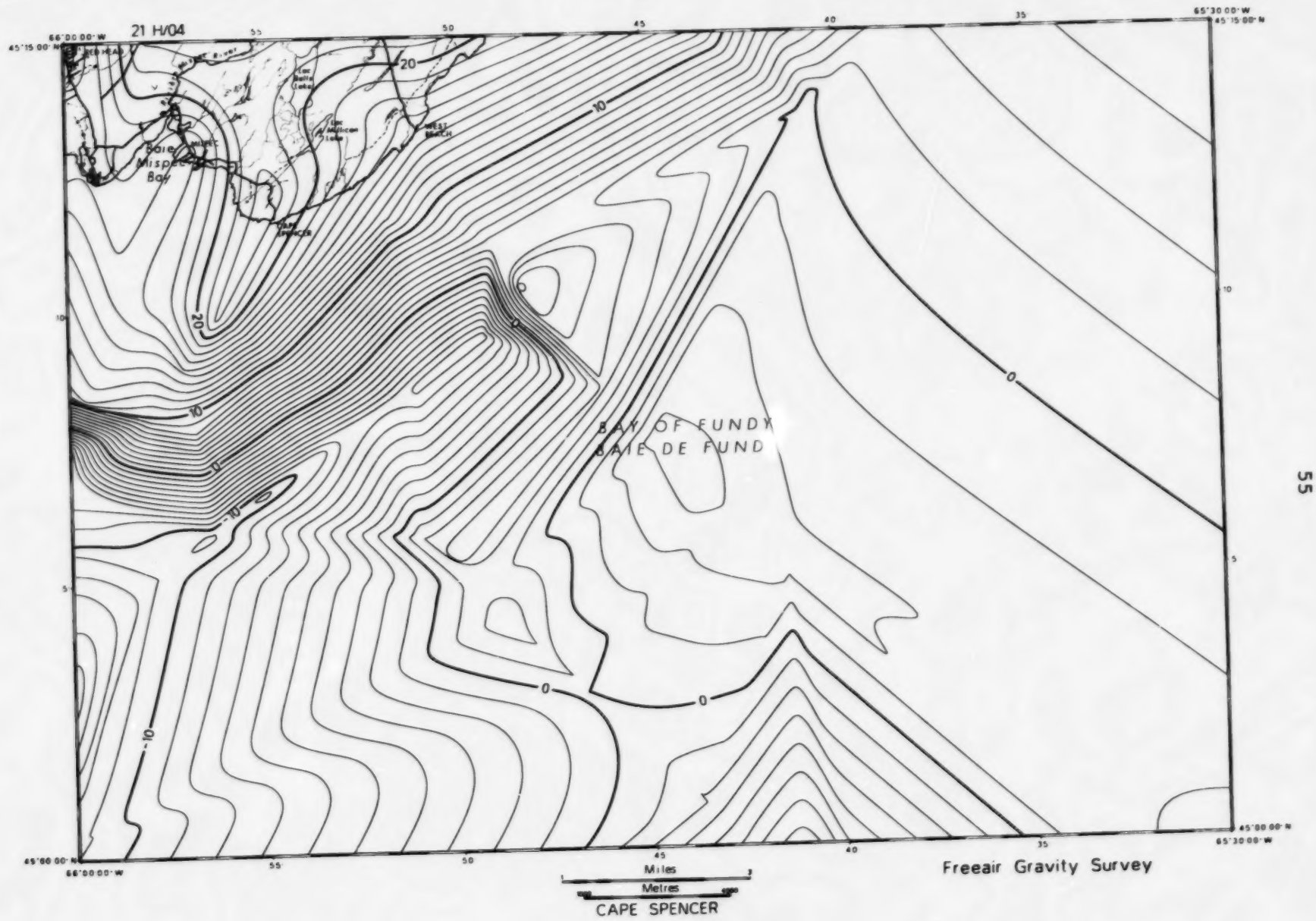

21 G/15
67°00'00" W
66°30'00" W
46°00'00" N
45°45'00" N
Miles
Metres
FREDERICTON
Freeair Gravity Survey

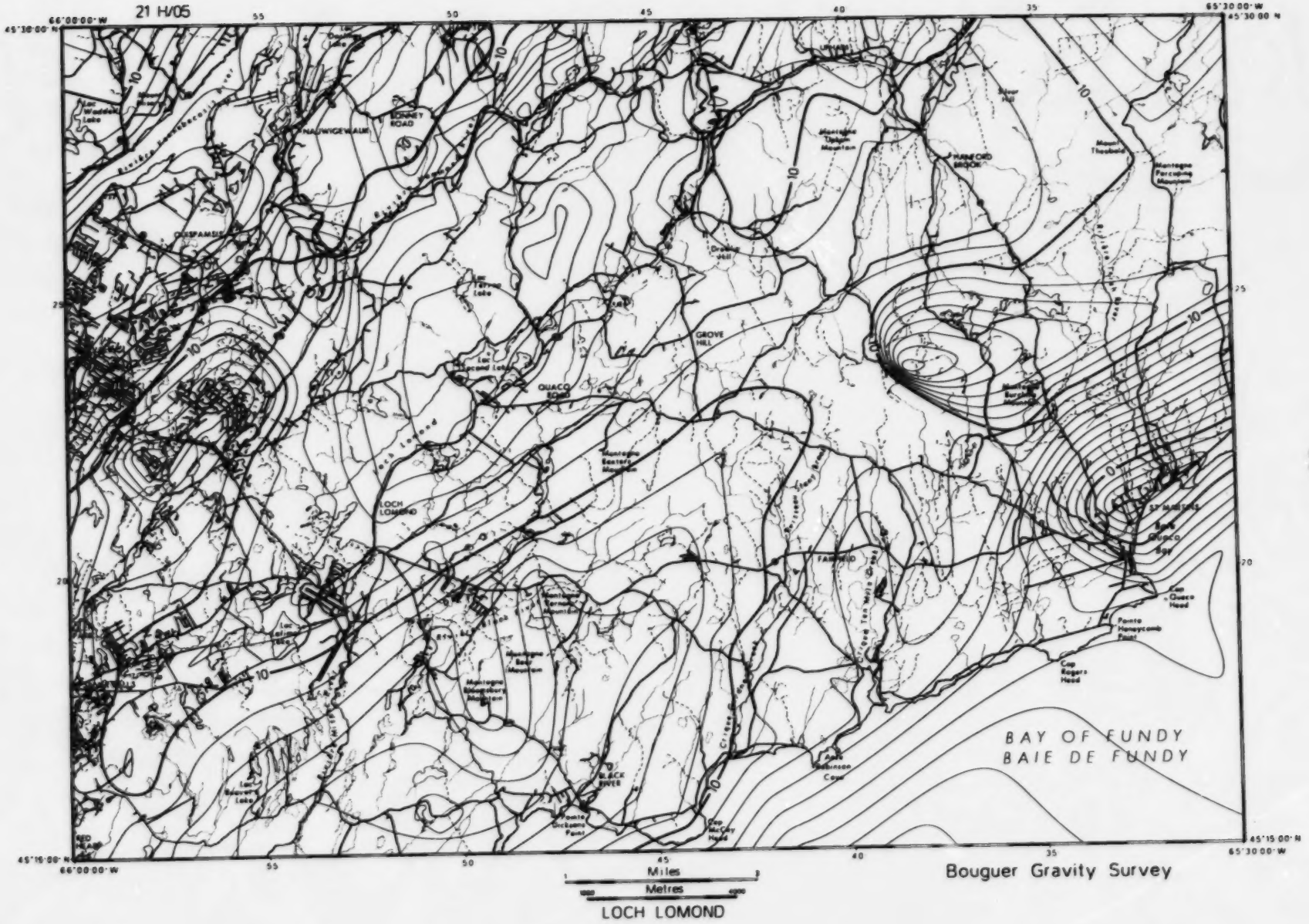

21 G/16
66°30'00" W
66°00'00" W
46°00'00" N
45°45'00" N
25
20
15
10
5
Bake
Cumberland
Bay
-20
-10
Low
Hudson
Lake
Low
French
Lake
Low
Hazelhurst
Lake
Low
Frood
Lake
PRINCESS
PARK
SANDFIELD
BEAUSEVILLE
Bridges
Saint John
River
OROMOCTO
CFB GAGETOWN
DFC GAGETOWN
GAGETOWN
CRABBE
SEARY
Miles
Metres
GRAND LAKE
Bouguer Gravity Survey


21 G/16
Bale
Cumberland
Bay
OFB GAGETOWN
AFC GAGETOWN
Miles
Metres
Freeair Gravity Survey
GRAND LAKE

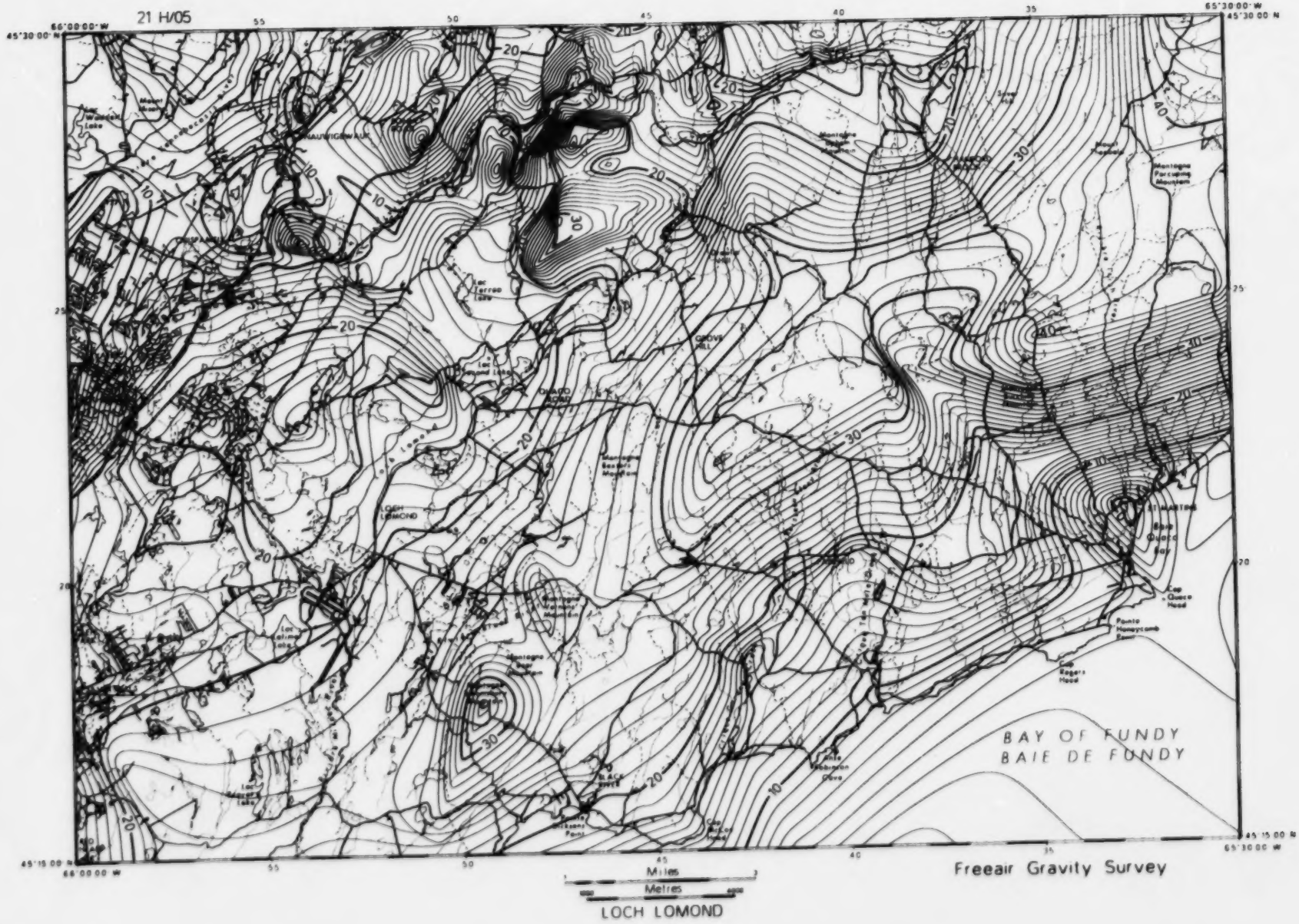


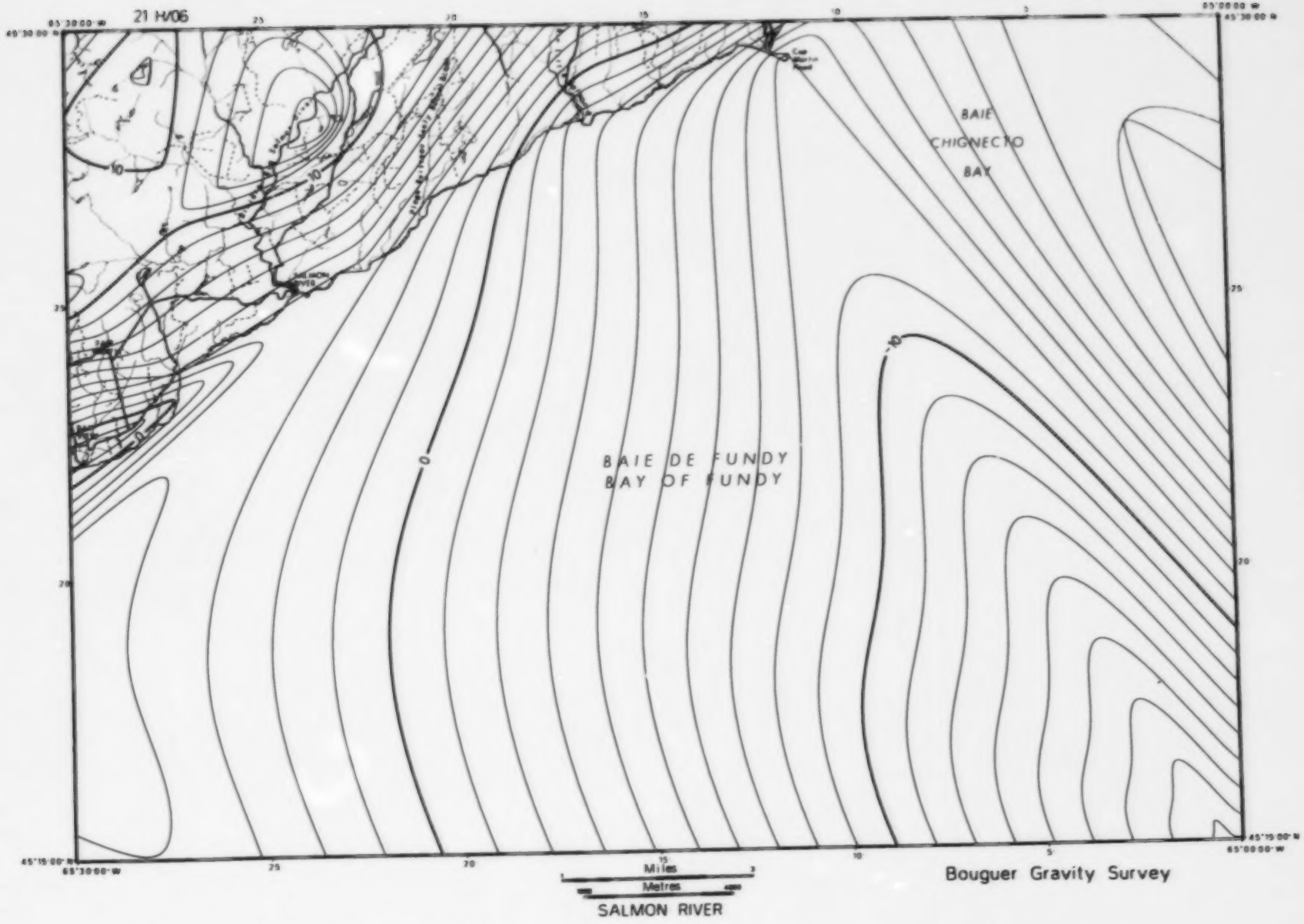
Bouguer Gravity Survey


21 H/04
66°00'00"W
45°15'00"N
65°30'00"W
45°00'00"N
Baie Mispec
Bay
BAY OF FUNDY
BAIE DE FUND
20
10
0
-10
Miles
Metres
CAPE SPENCER
Freeair Gravity Survey

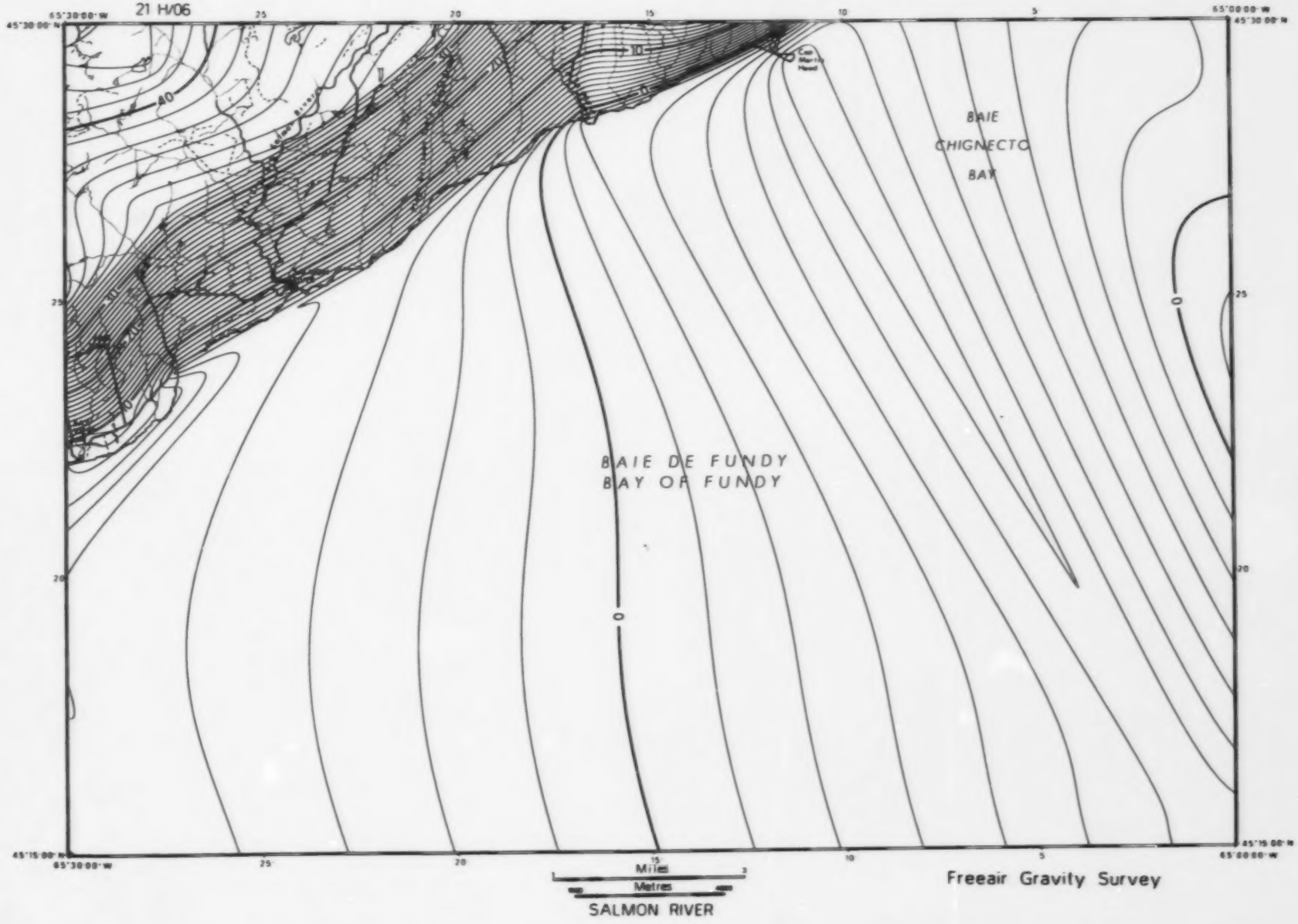


Bouguer Gravity Survey

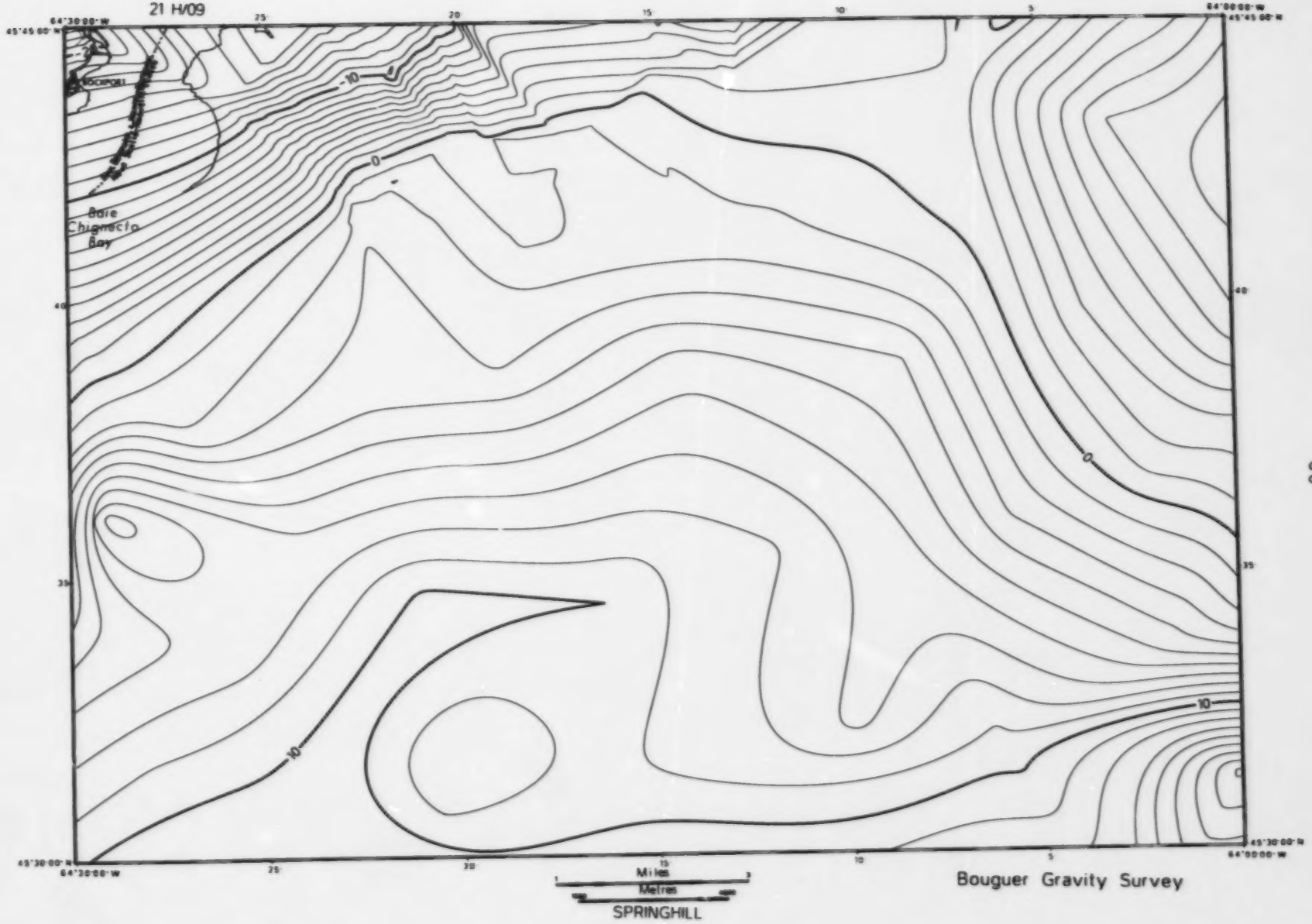

21 H/05
65°30'00"W
45°30'00"N
45°15'00"N
BAY OF FUNDY
BAIE DE FUNDY
Miles
Metres
LOCH LOMOND
Freeair Gravity Survey

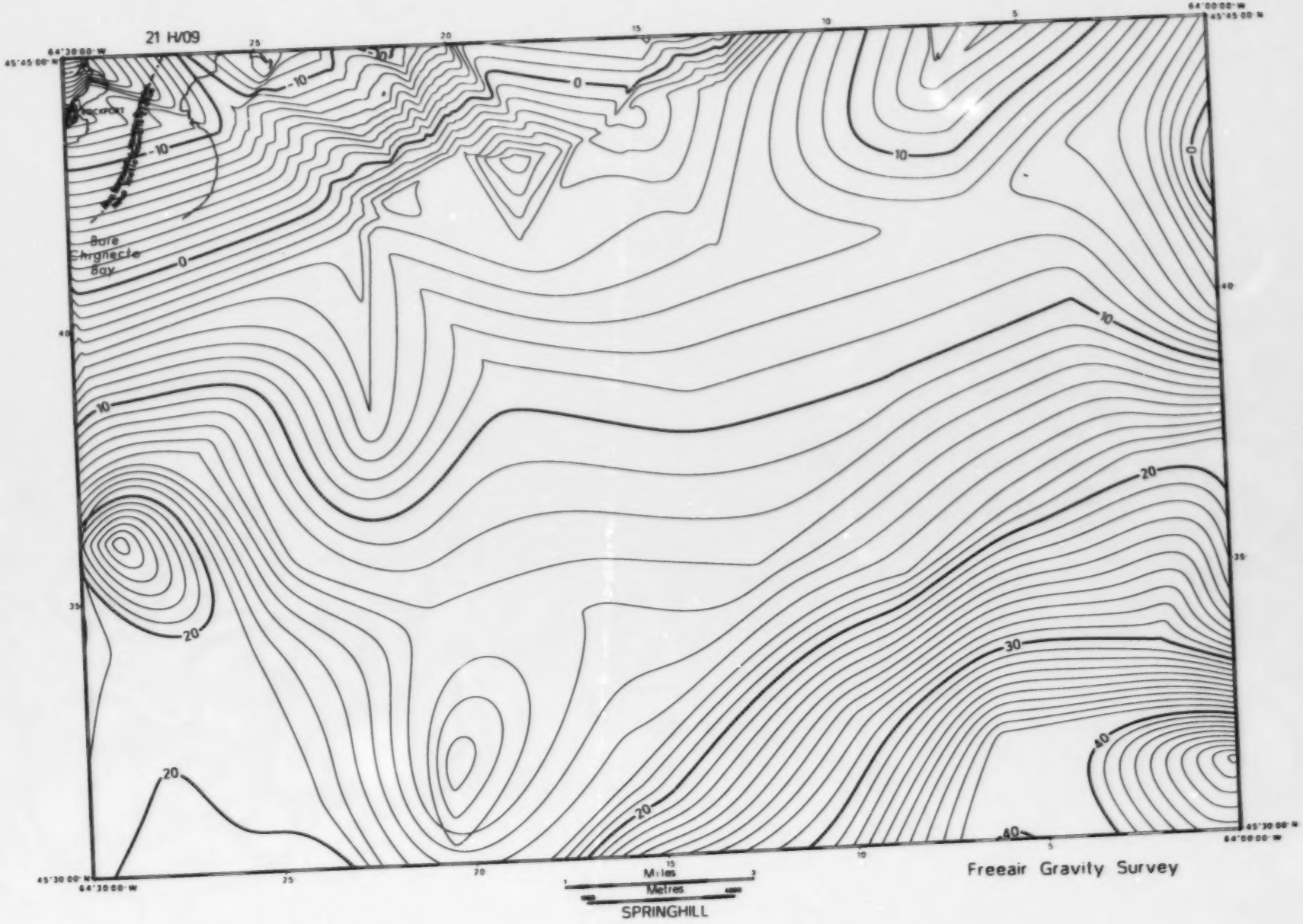


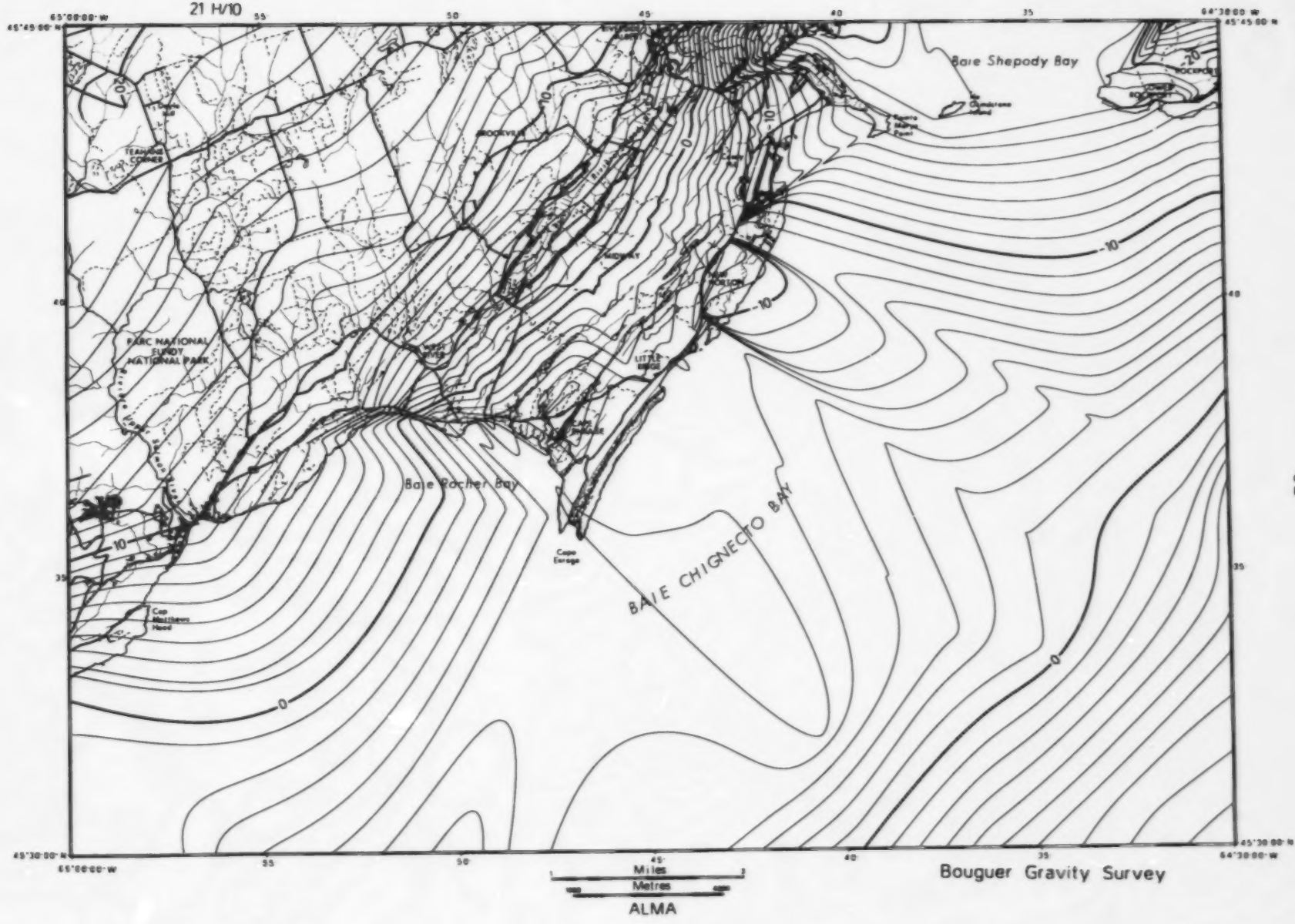
Bouguer Gravity Survey

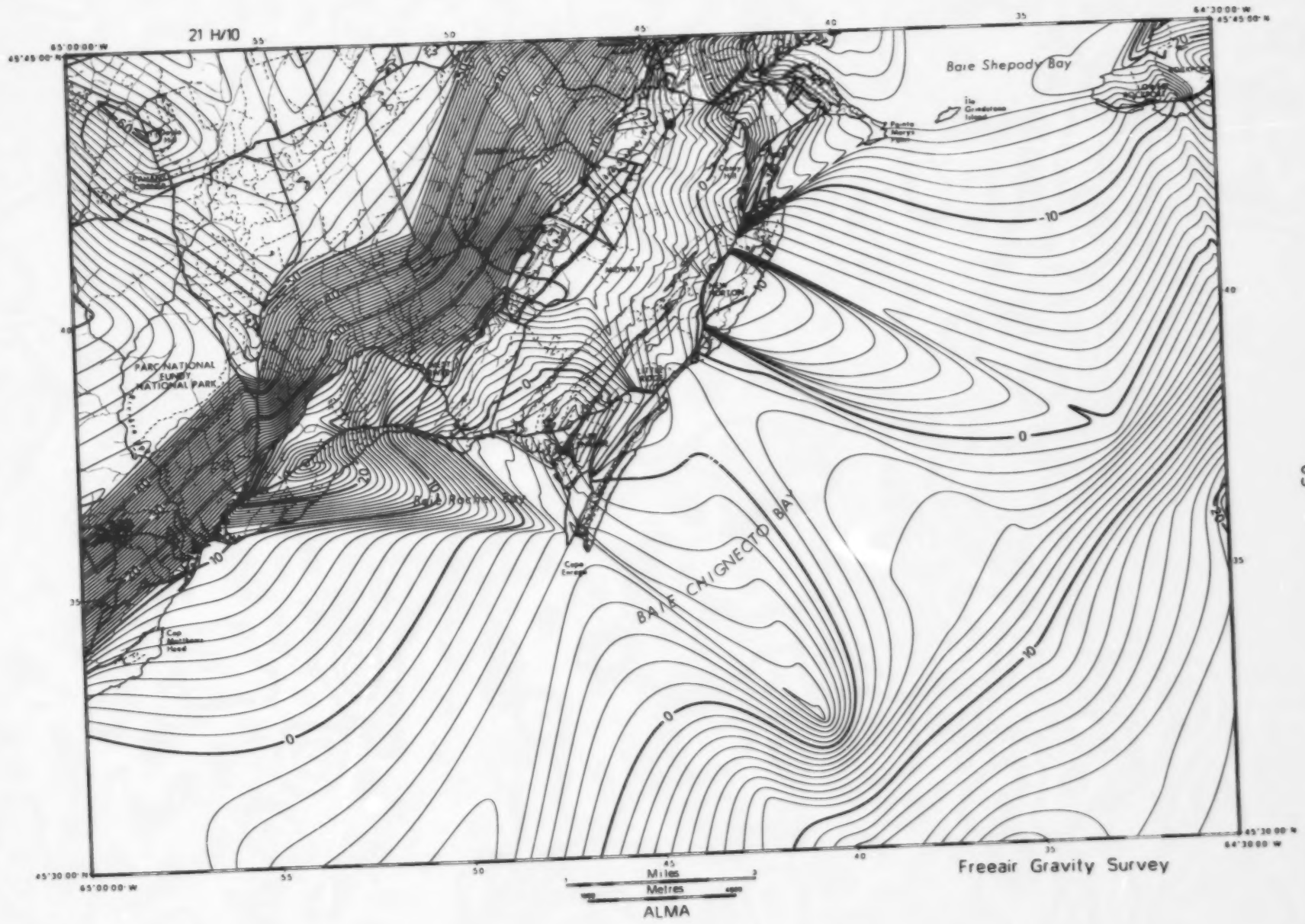


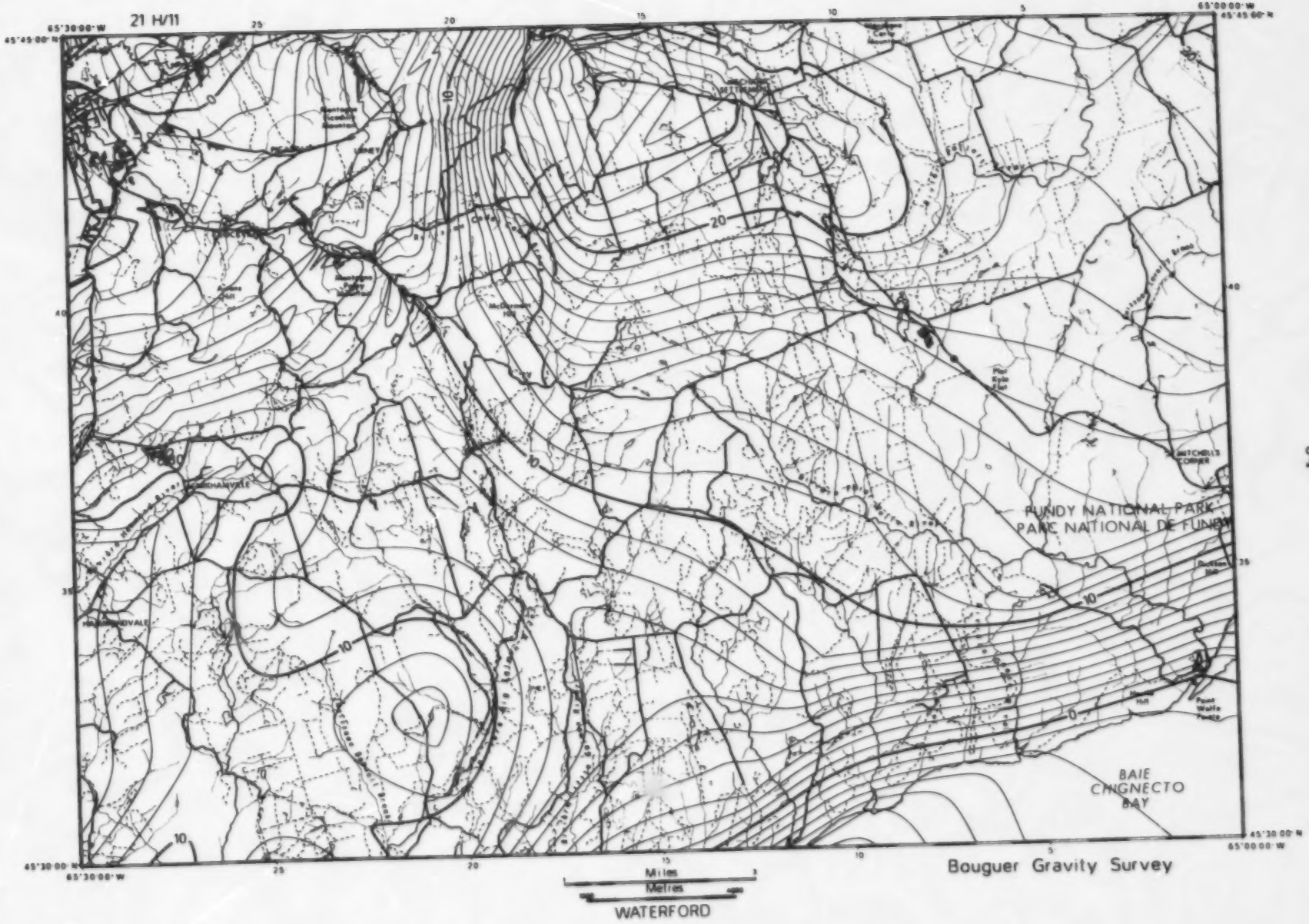
Freeair Gravity Survey

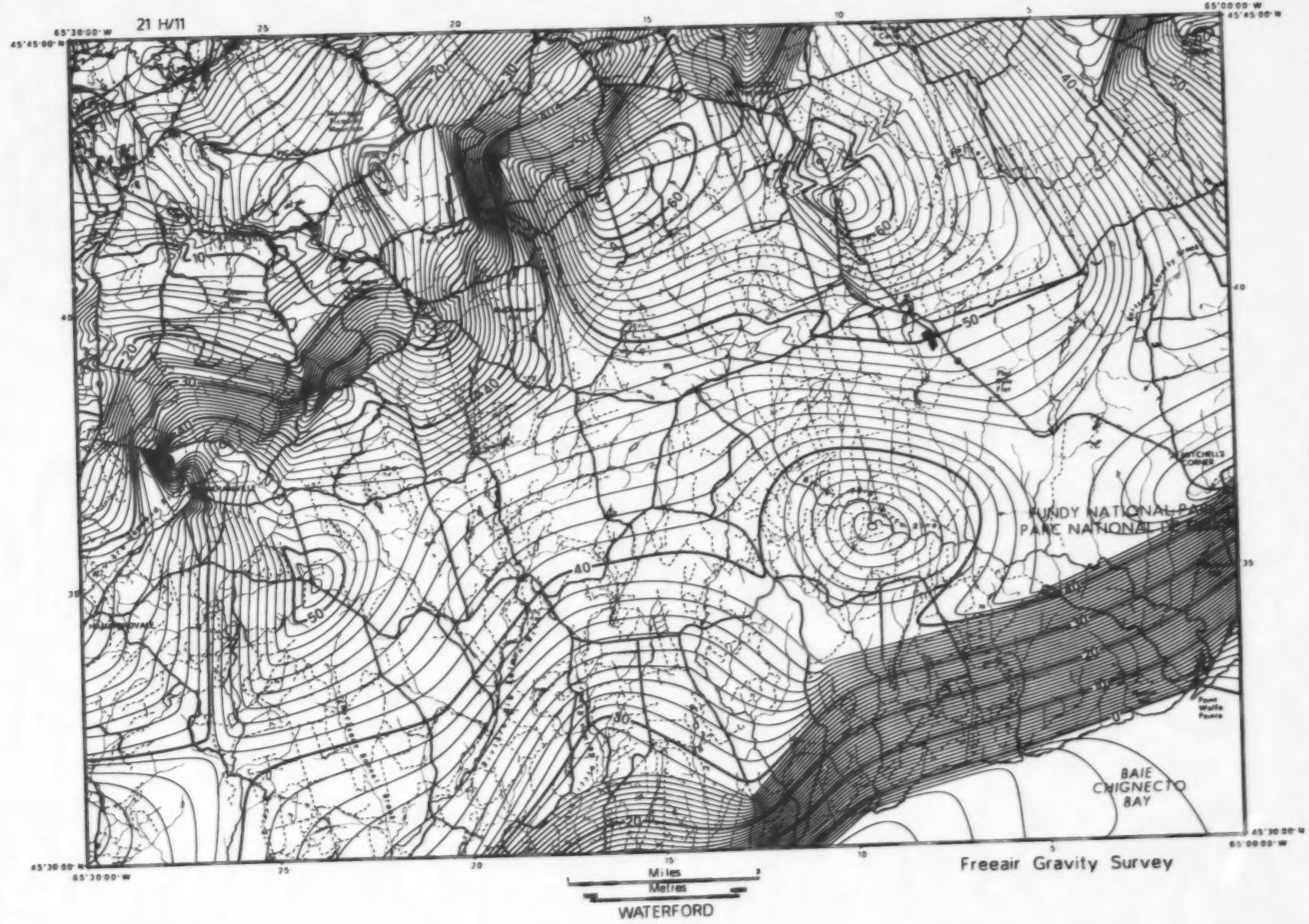

21 H/09
64°30'00"W
45°45'00"N
25
20
15
10
5
64°00'00"W
Baie Chignecto Bay
-10
0
10
40
35
45°30'00"N
Miles
Metres
SPRINGHILL
Bouguer Gravity Survey

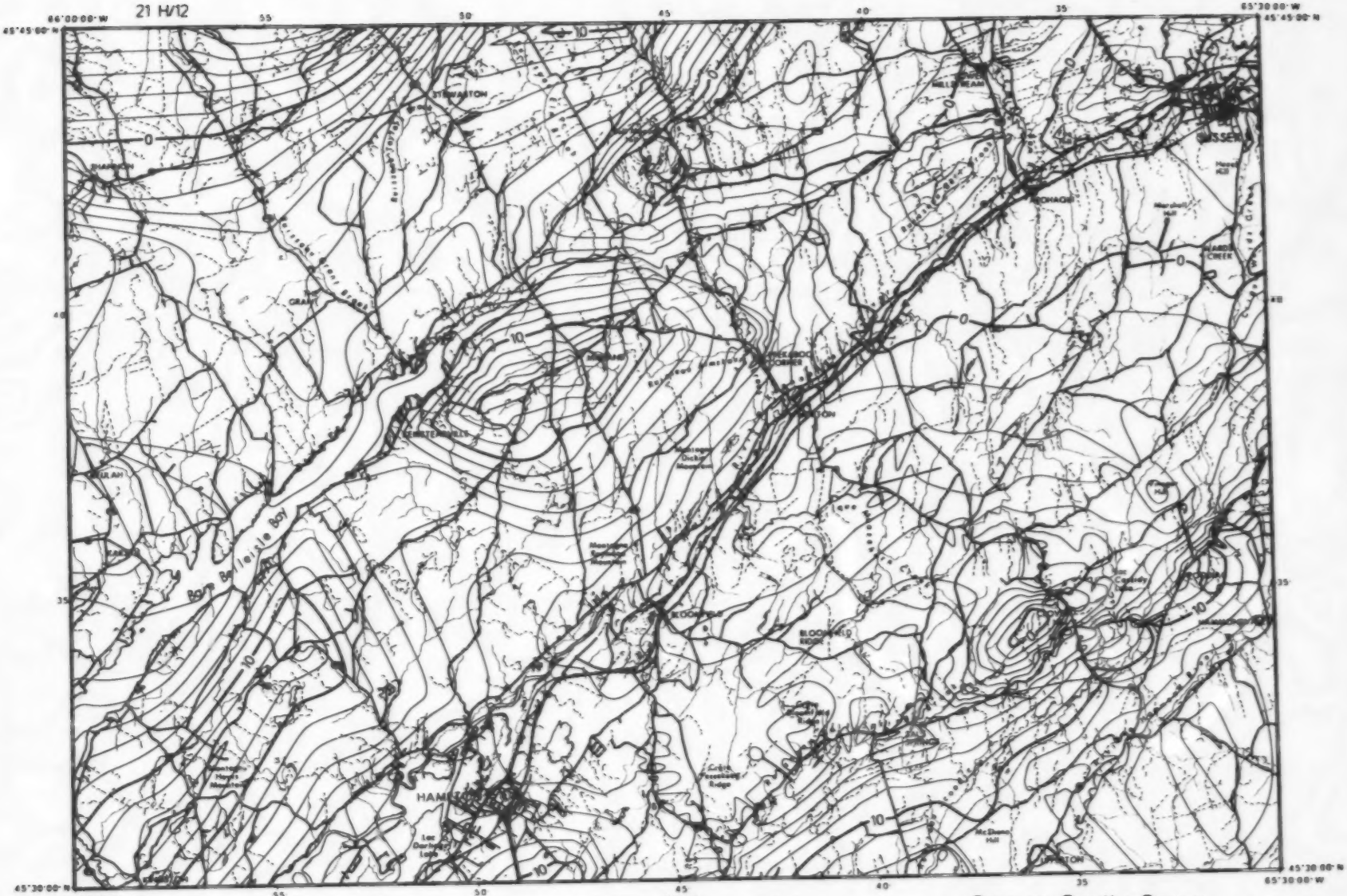

21 H/09
64°30'00"W
45°45'00"N
64°00'00"W
45°30'00"N
Bare
Chignecto
Bay
-10
0
10
20
30
40
25
20
15
10
5
Miles
Metres
SPRINGHILL
Freeair Gravity Survey

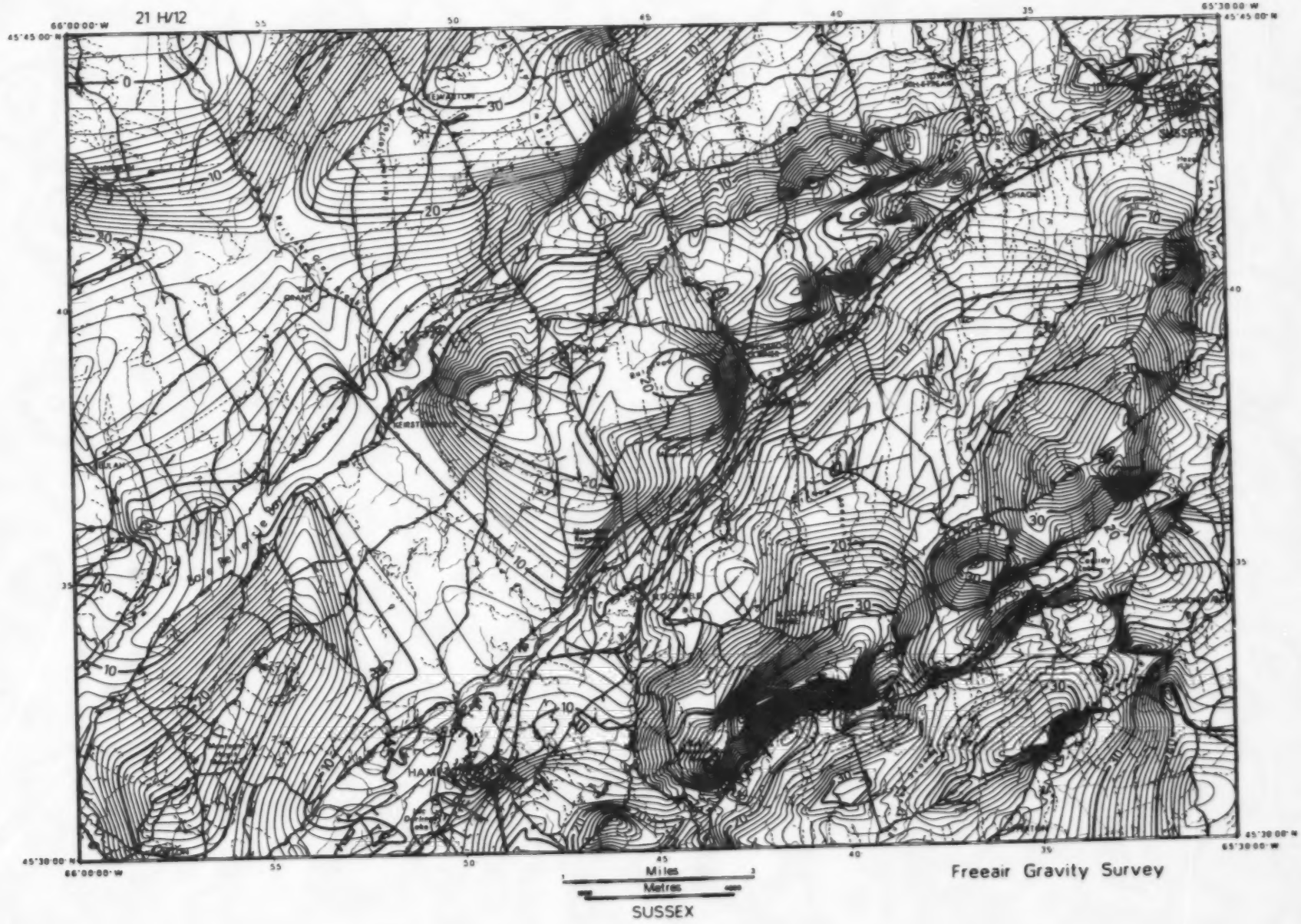

21 H/10
65°00'00" W
64°30'00" W
45°45'00" N
45°30'00" N
Baie Shepody Bay
Baie Pacher Bay
BAIE CHIGNECTO BAY
PARC NATIONAL FUNDY NATIONAL PARK
Cape Enragé
Cape Matthews Head
-10
0
10
20
Miles
Metres
ALMA
Bouguer Gravity Survey

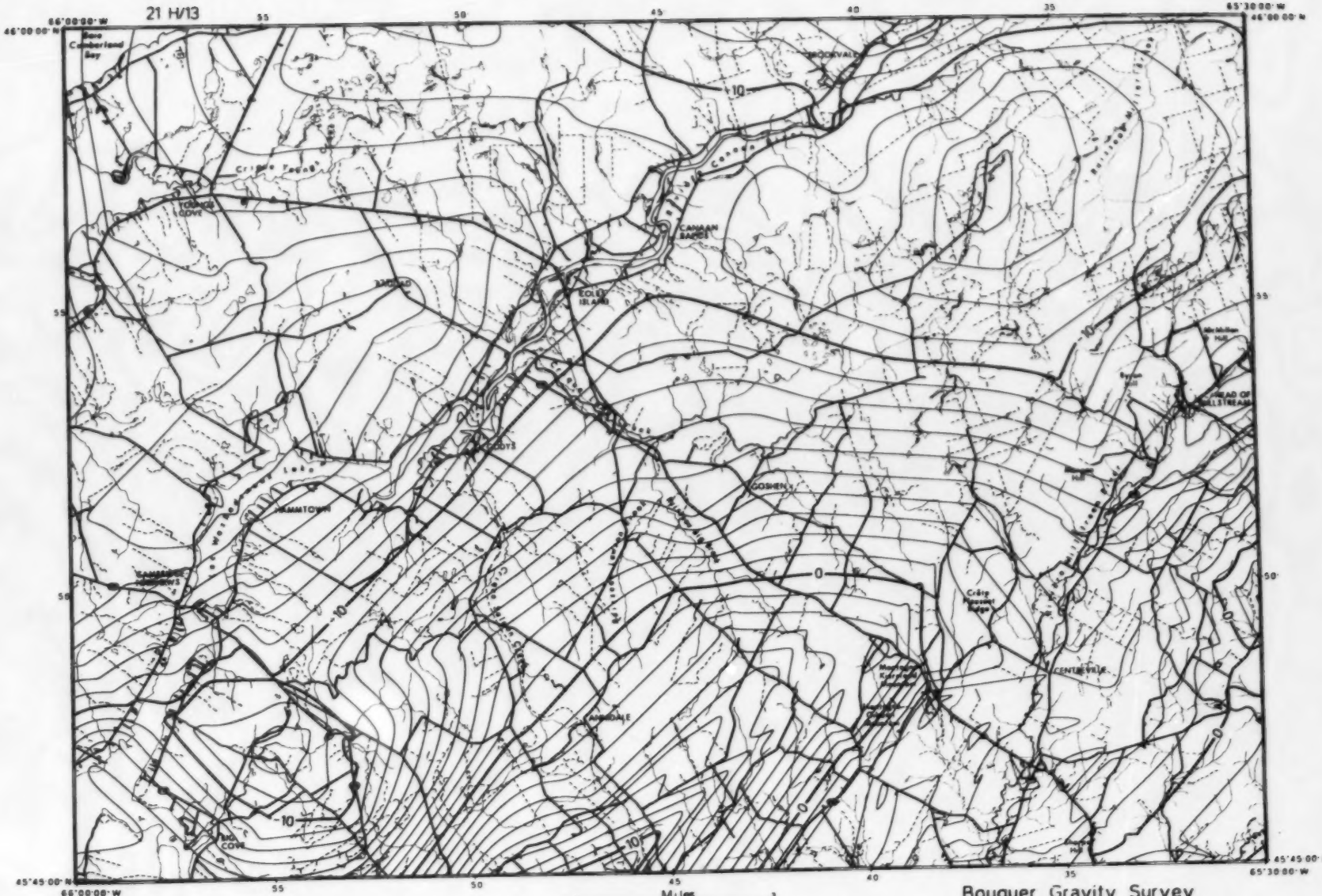

21 H/10
65°00'00" W
45°45'00" N
64°30'00" W
45°30'00" N
Baie Shepody Bay
Ile Grindstone Island
Pointe Marys Pigeon
PARC NATIONAL FUNDY NATIONAL PARK
Baie Rochester Bay
BAIE CHIGNECTO BAY
Cape Enragé
Cap Maccan Head
-10
0
10
20
30
40
50
60
55
45
35
Miles
Metres
ALMA
Freeair Gravity Survey

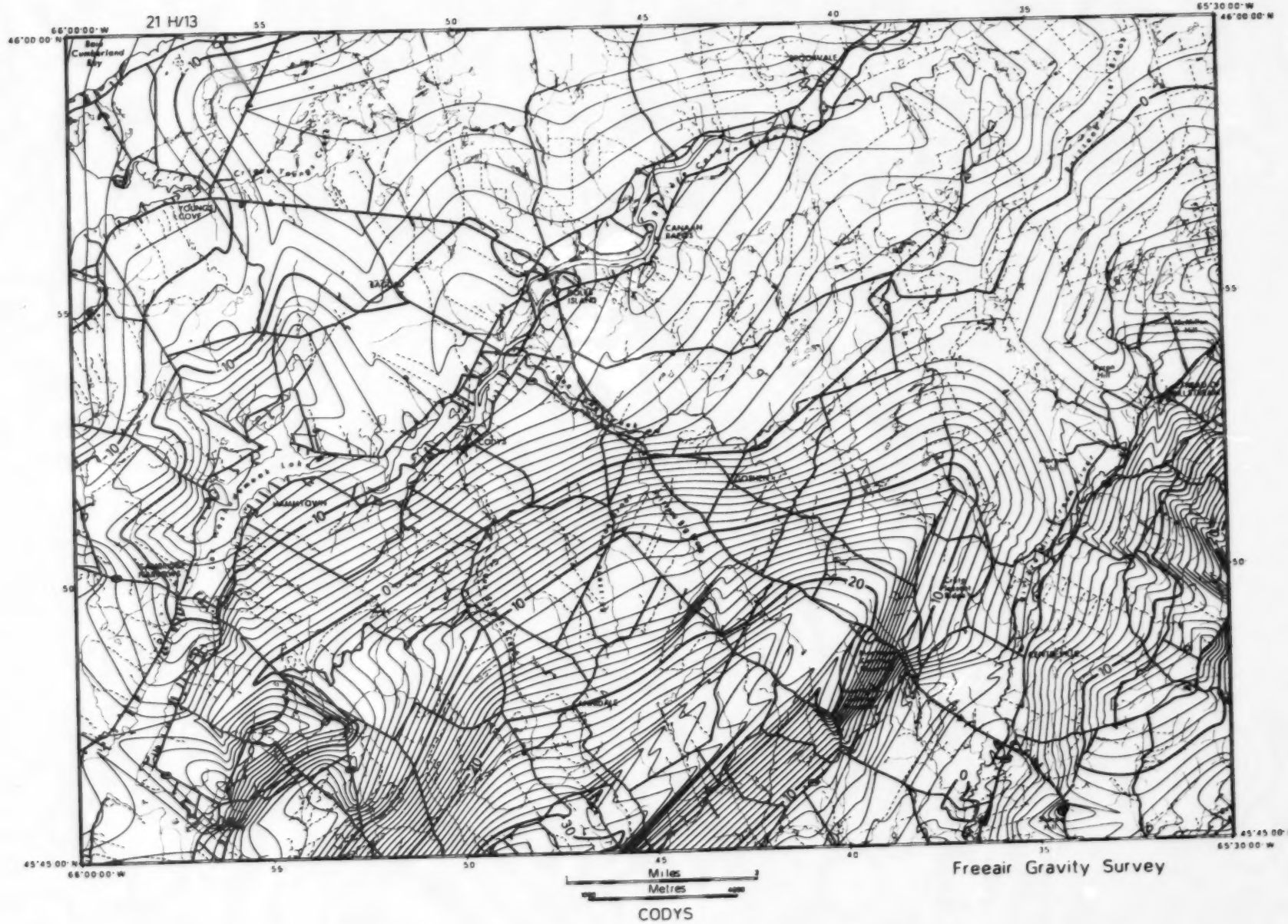

21 H/11
65°30'00"W
45°45'00"N
65°00'00"W
45°30'00"N
FUNDY NATIONAL PARK
PARC NATIONAL DE FUNDY
BAIE
CHIGNECTO
BAY
Miles
Metres
WATERFORD
Bouguer Gravity Survey

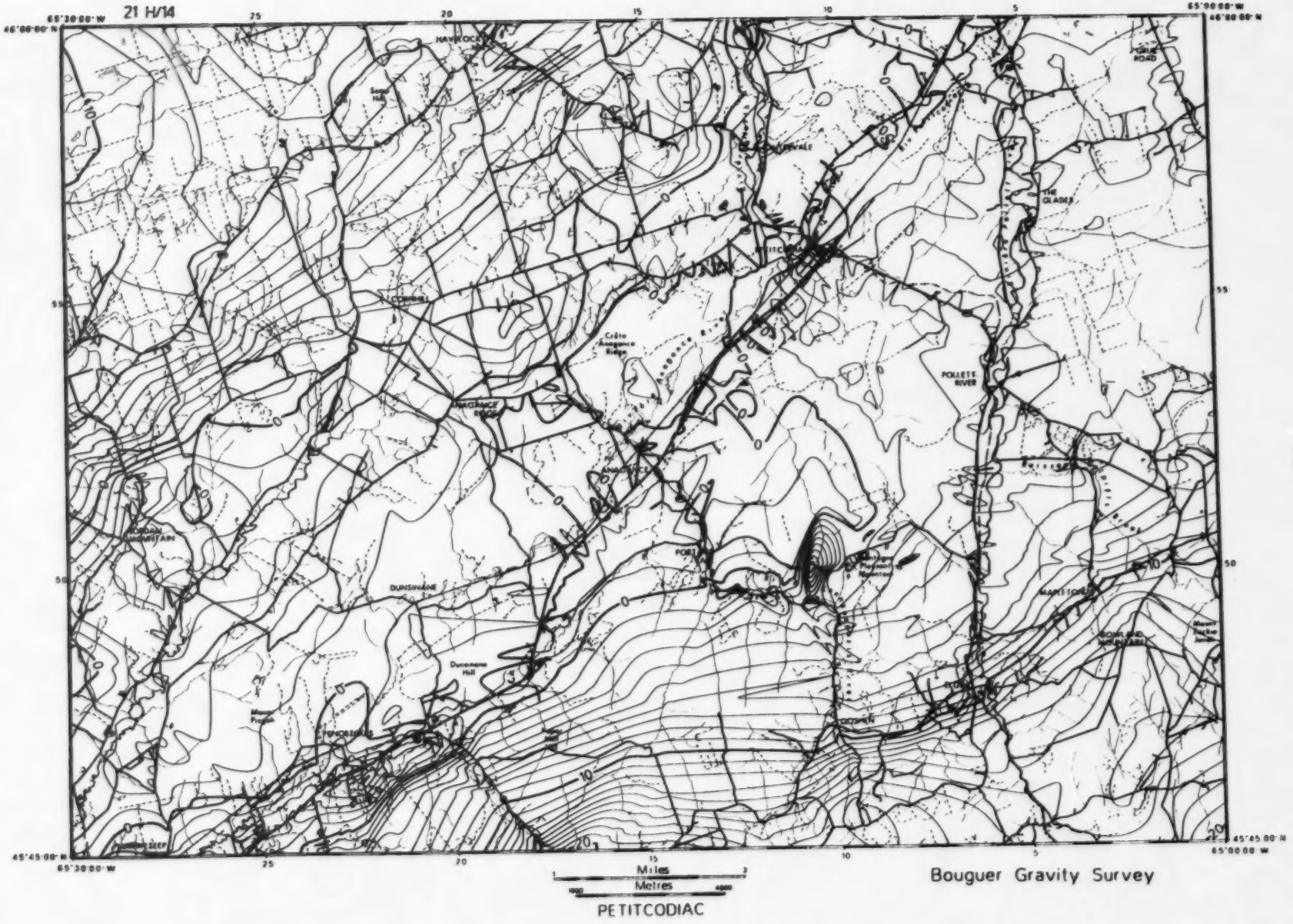

21 H/11
65°30'00" W
45°45'00" N
65°00'00" W
45°45'00" N
25
20
15
10
5
40
35
65°30'00" W
65°00'00" W
45°30'00" N
45°30'00" N
FUNDY NATIONAL PARK
PARC NATIONAL FUNDY
BAIE CHIGNECTO BAY
Miles
Metres
WATERFORD
Freeair Gravity Survey

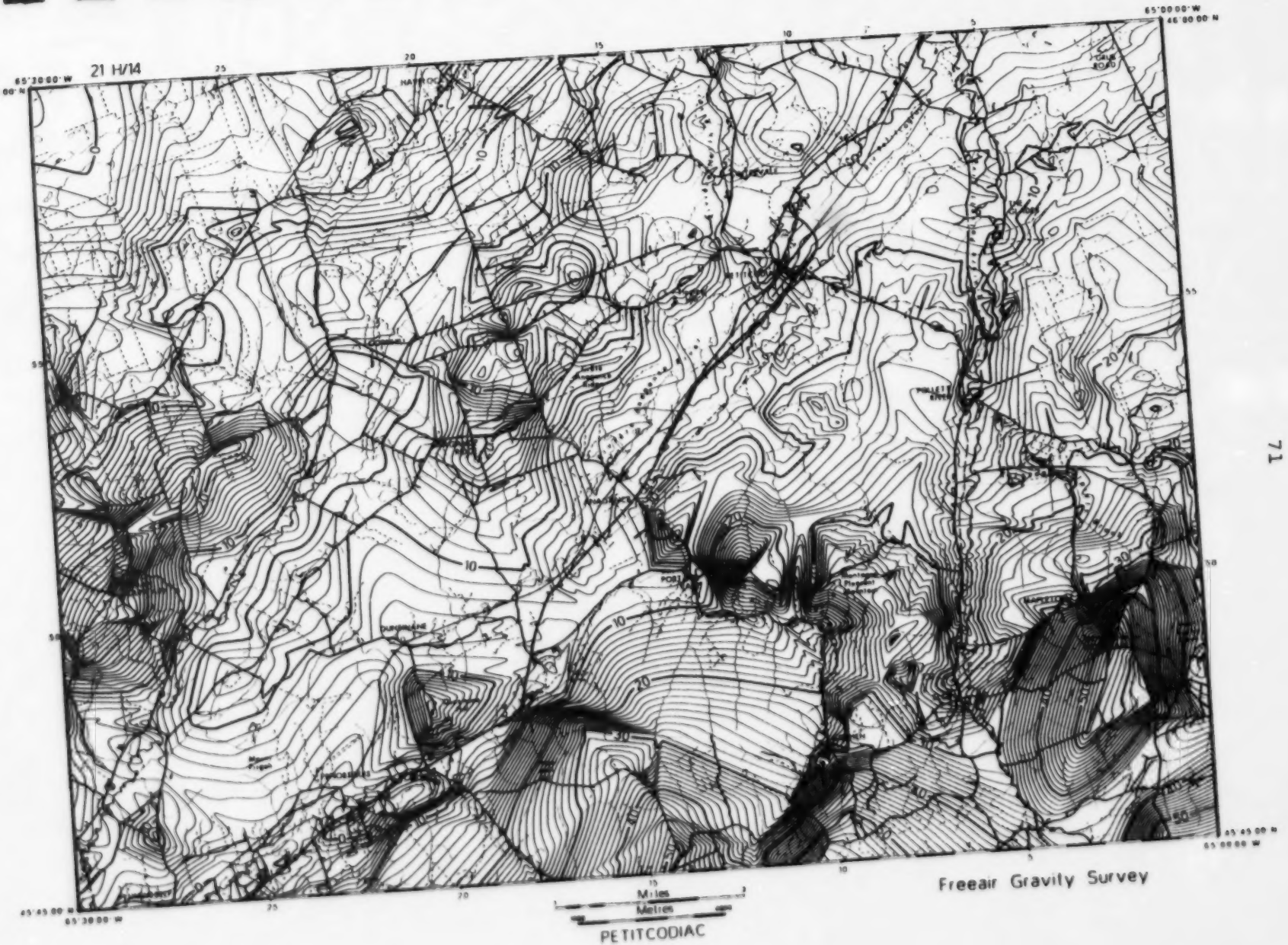

21 H/12
66°00'00"W
65°30'00"W
45°45'00"N
45°30'00"N
55
50
45
40
35
STEWIACKE
SUSSEX
HAMILTON
Bay of Islands Bay
Miles
Metres
SUSSEX
Bouguer Gravity Survey

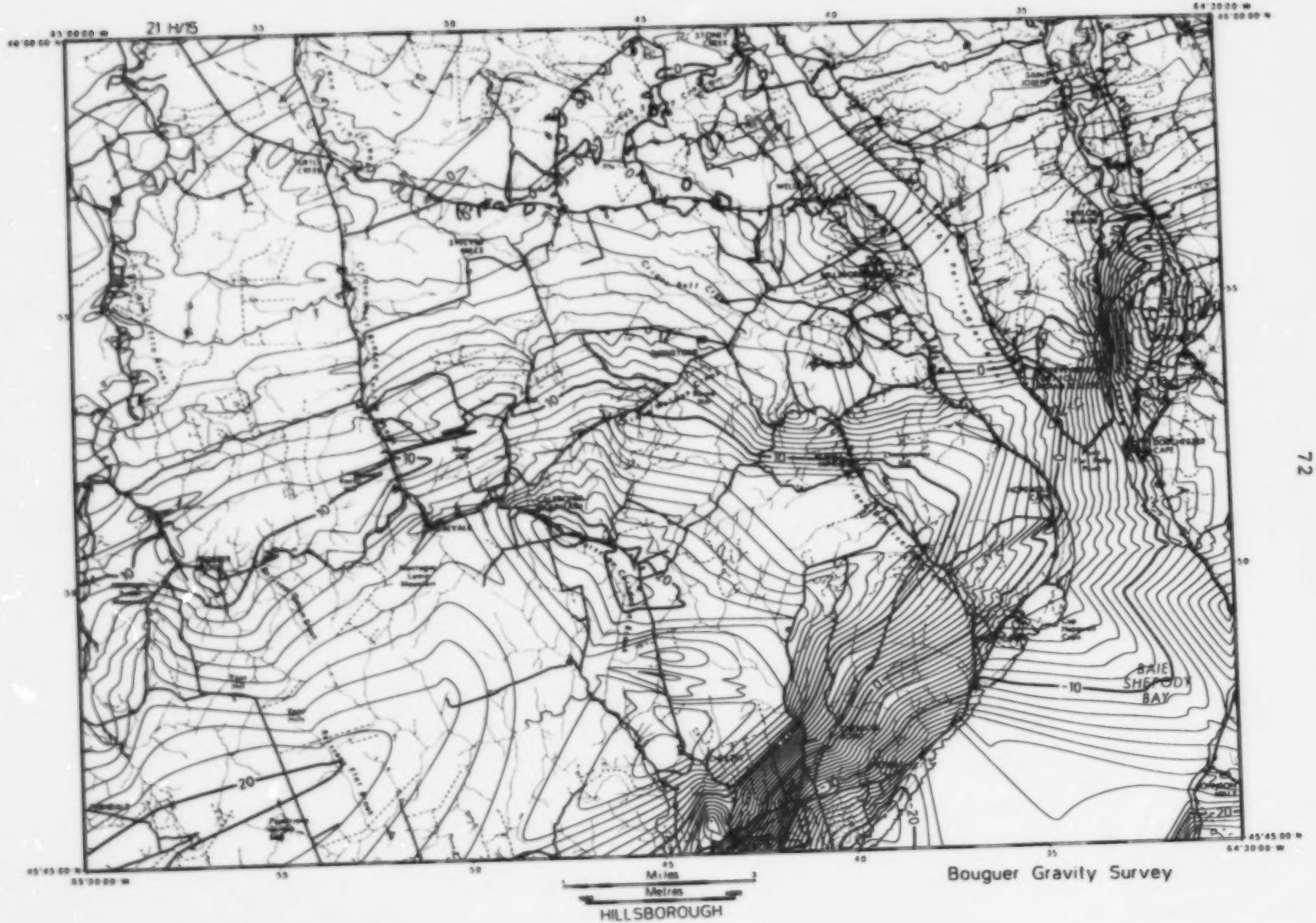

21 H/12
66°00'00" W
65°30'00" W
45°45'00" N
45°30'00" N
55
50
45
40
35
0
10
20
30
SUSSEX
Miles
Metres
SUSSEX
Freeair Gravity Survey


21 H/13
66°00'00"W
46°00'00"N
45°45'00"N
65°30'00"W
55
50
45
40
35
Miles
Metres
CODYS
Bouguer Gravity Survey

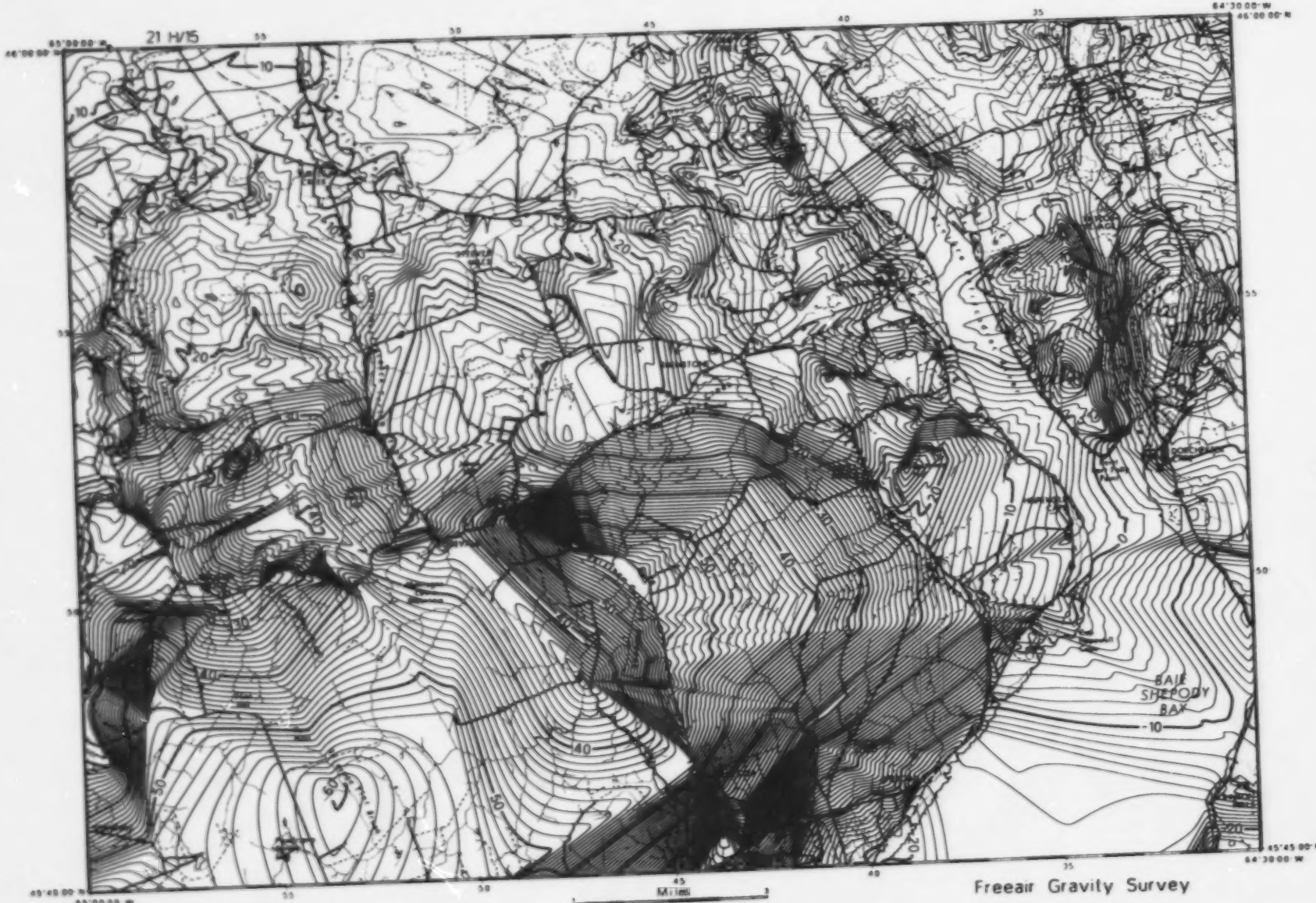

21 H/13
66°00'00" W
46°00'00" N
65°30'00" W
45°45'00" N
55
50
45
40
35
Bay Cumberland
Codys
Miles
Metres
CODYS
Freeair Gravity Survey


21 H/14
65°30'00"W
46°00'00"N
65°00'00"W
45°45'00"N
Miles
Metres
PETITCODIAC
Bouguer Gravity Survey

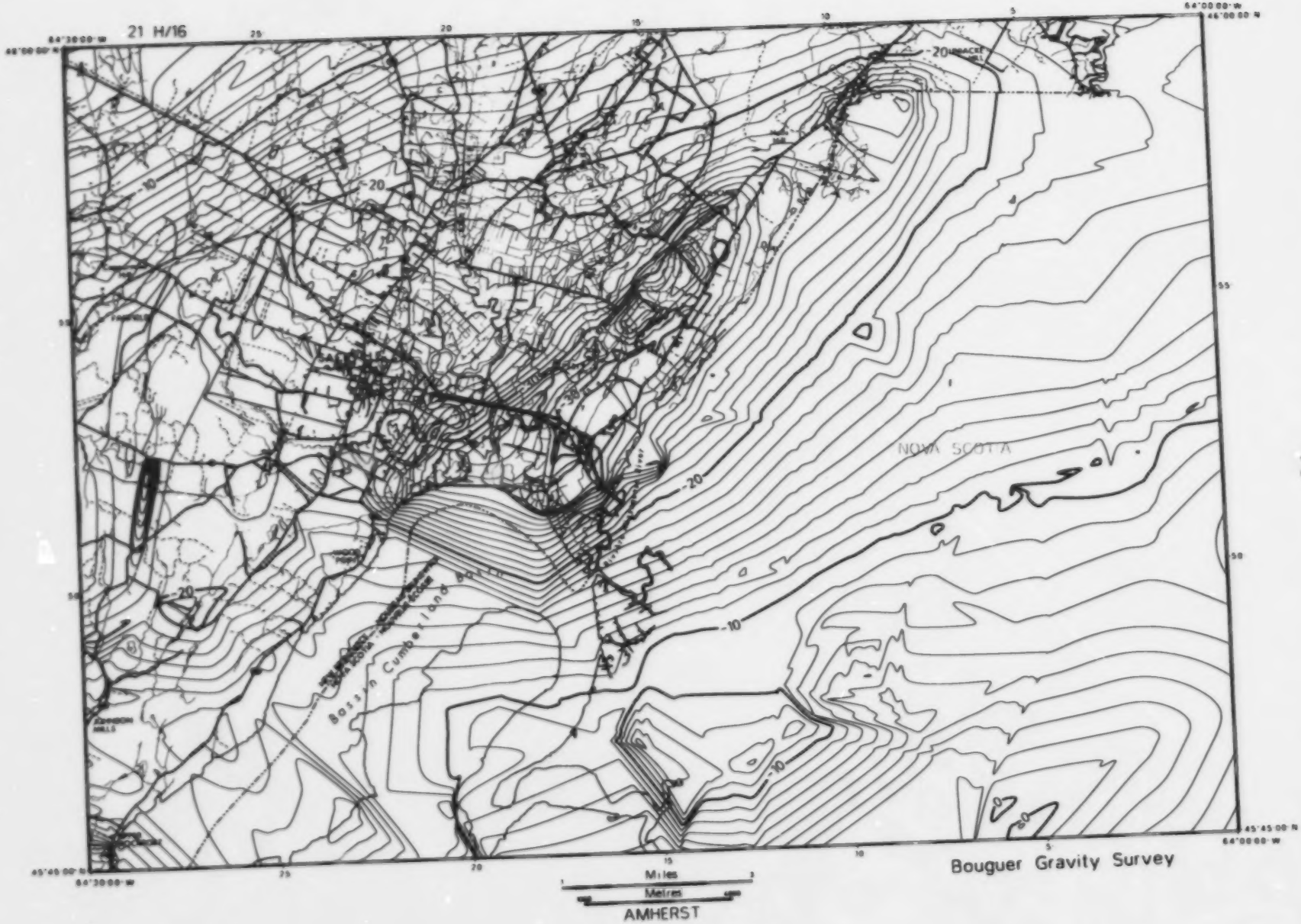

21 H/14
65°30'00"W
46°00'00"N
65°00'00"W
46°00'00"N
45°45'00"N
65°30'00"W
65°00'00"W
45°45'00"N
10
20
30
50
Miles
Metres
PETITCODIAC
Freeair Gravity Survey

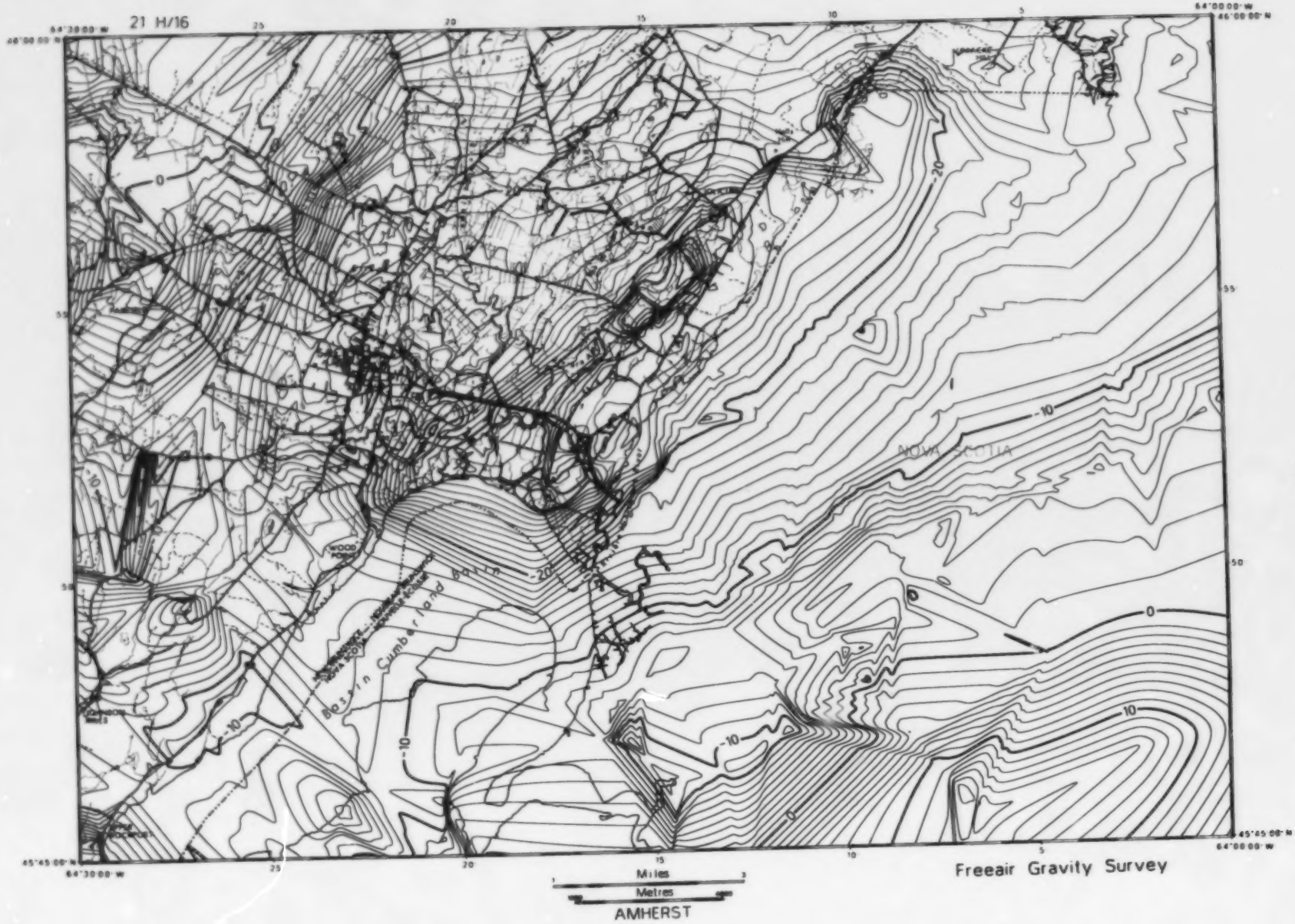


Bouguer Gravity Survey

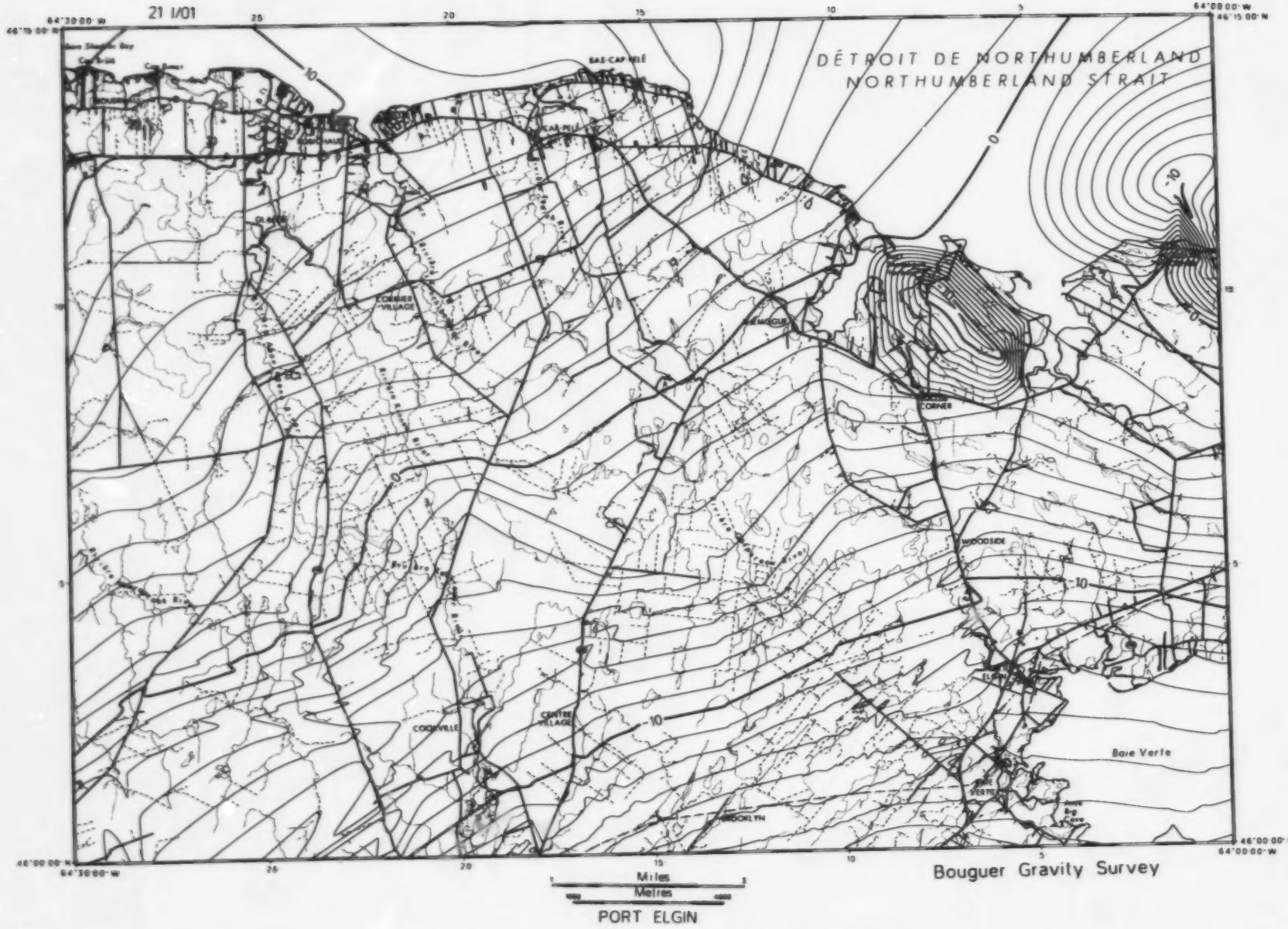


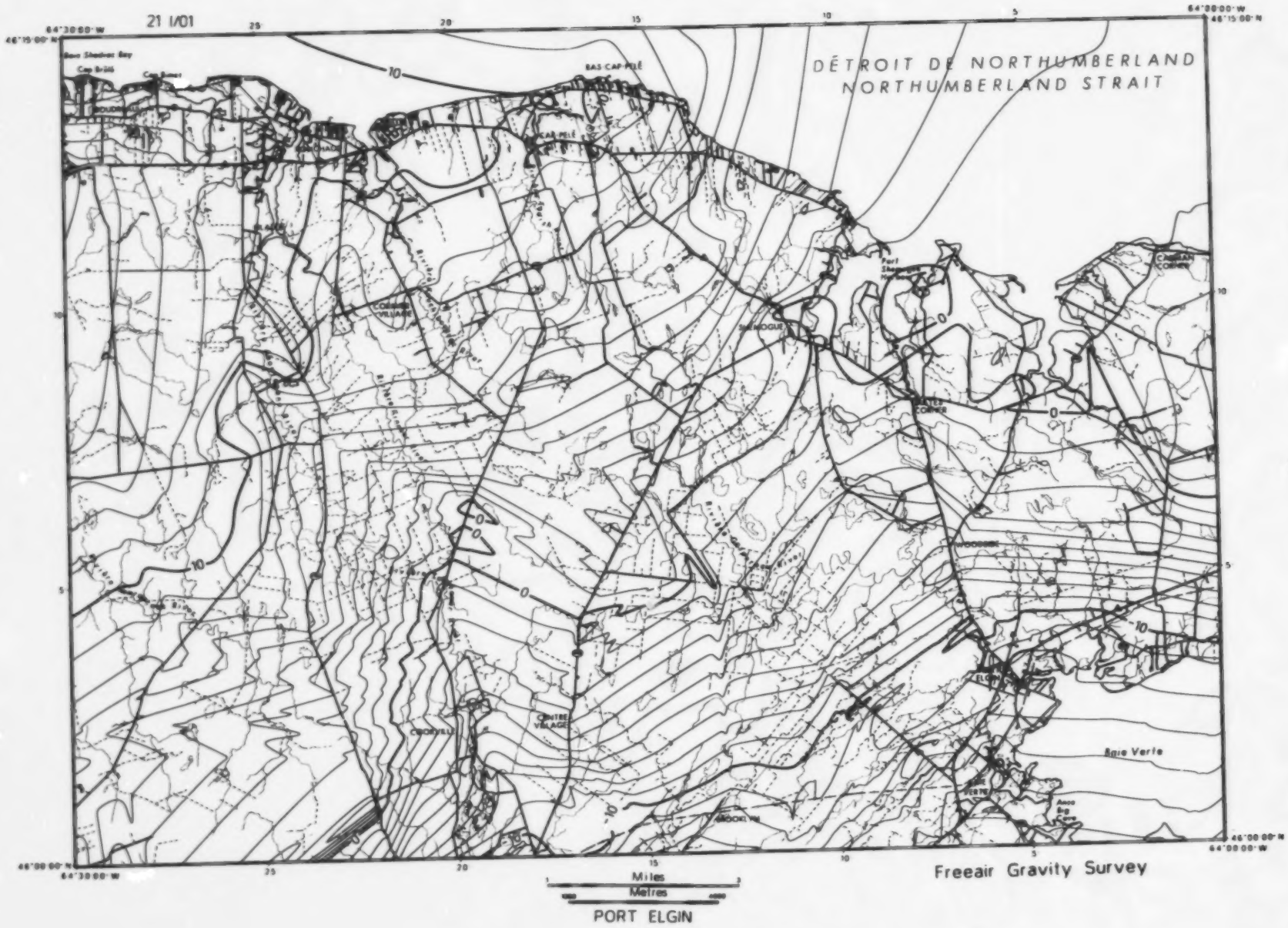
Freeair Gravity Survey

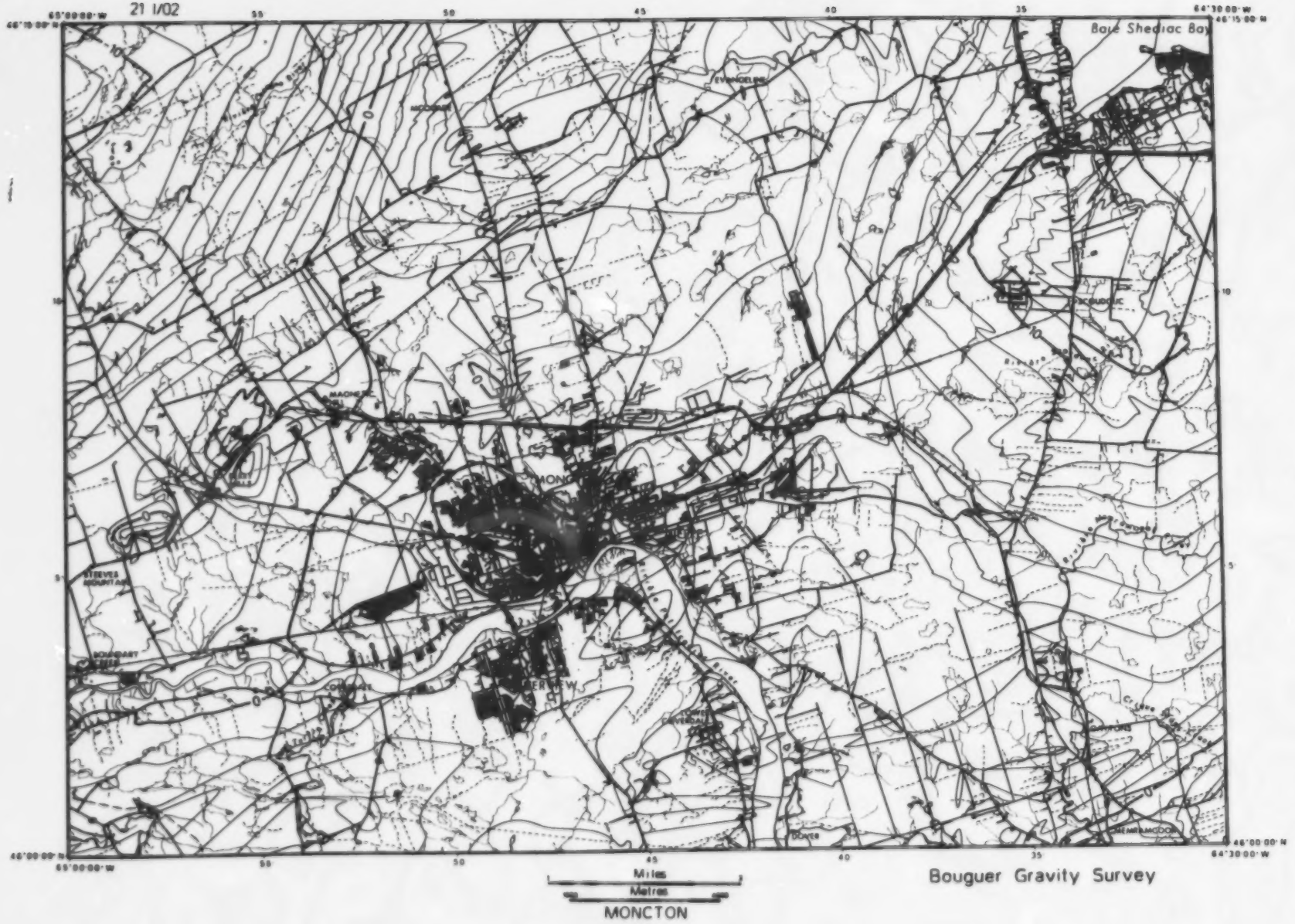

21 H/16
64°30'00" W
64°00'00" W
45°45'00" N
46°00'00" N
NOVA SCOTIA
Bouguer Gravity Survey
Miles
Metres
AMHERST



Freeair Gravity Survey

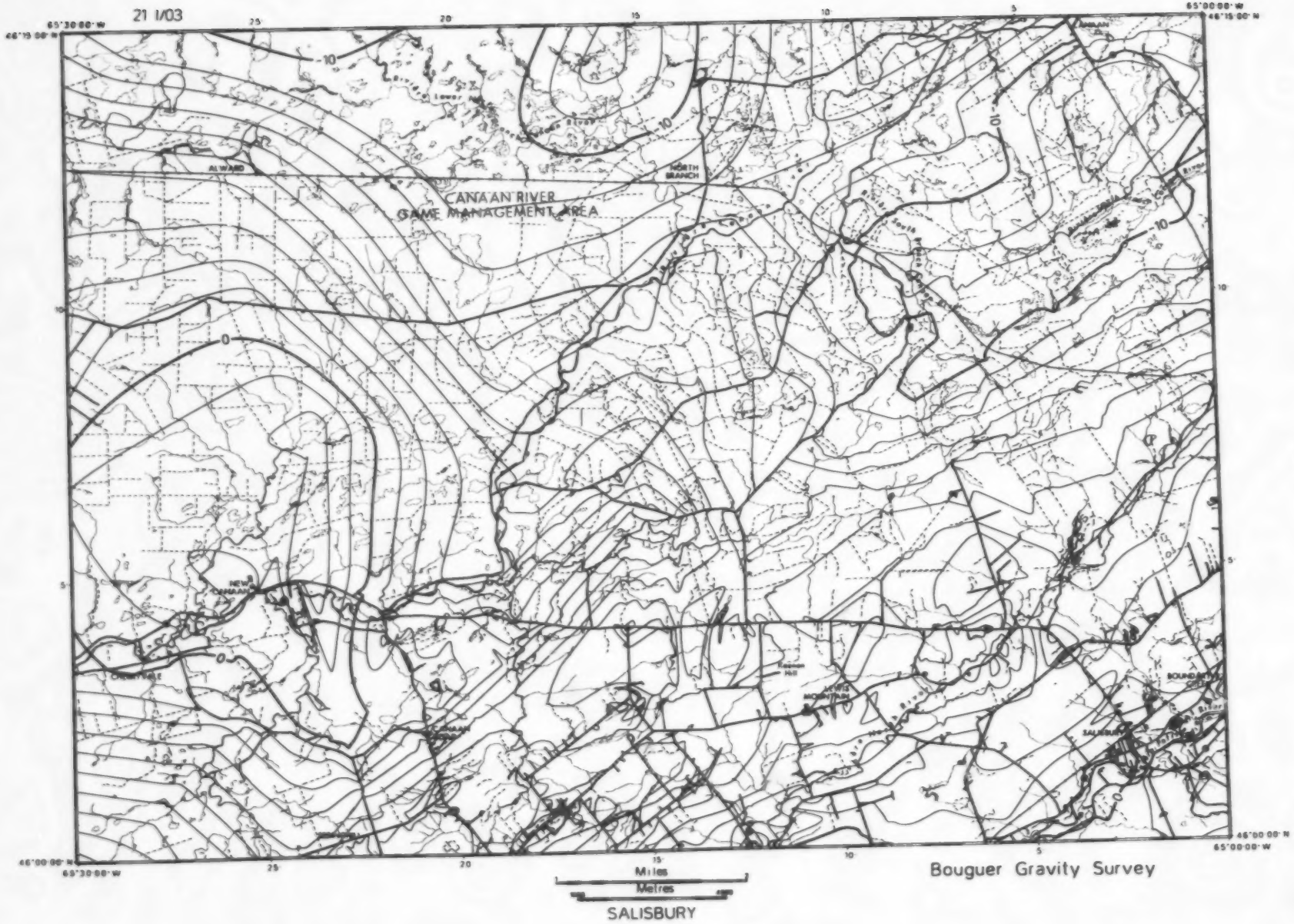

21 I/01
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
BAS-CAP-PELÉ
CAP-PELÉ
CORNER
WOODSIDE
COCAGNE
CENTRE VILLAGE
Baie Verte
10
0
-10
Miles
Metres
PORT ELGIN
Bouguer Gravity Survey

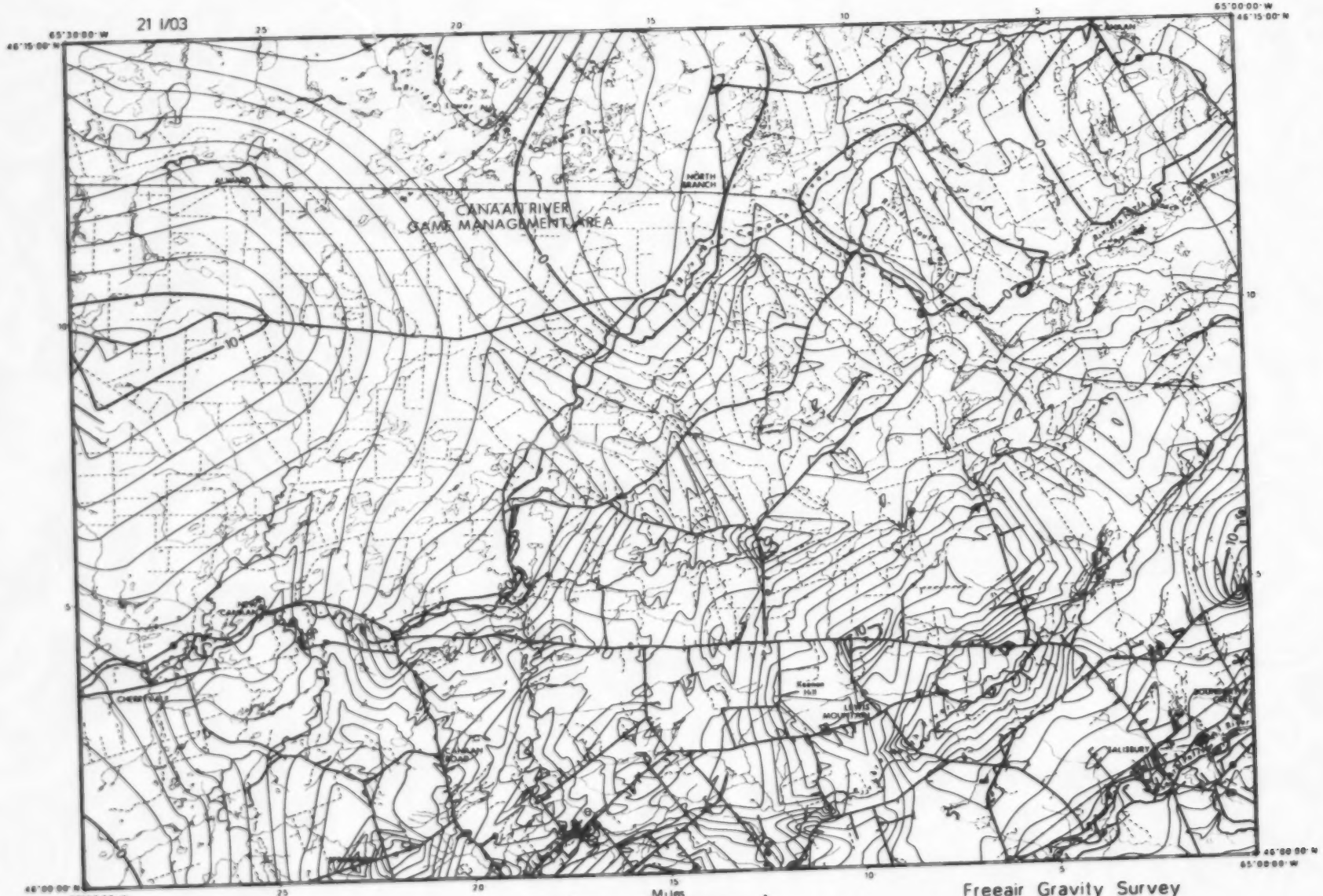

21 I/01
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
Baie Verte
Miles
Metres
PORT ELGIN
Freeair Gravity Survey



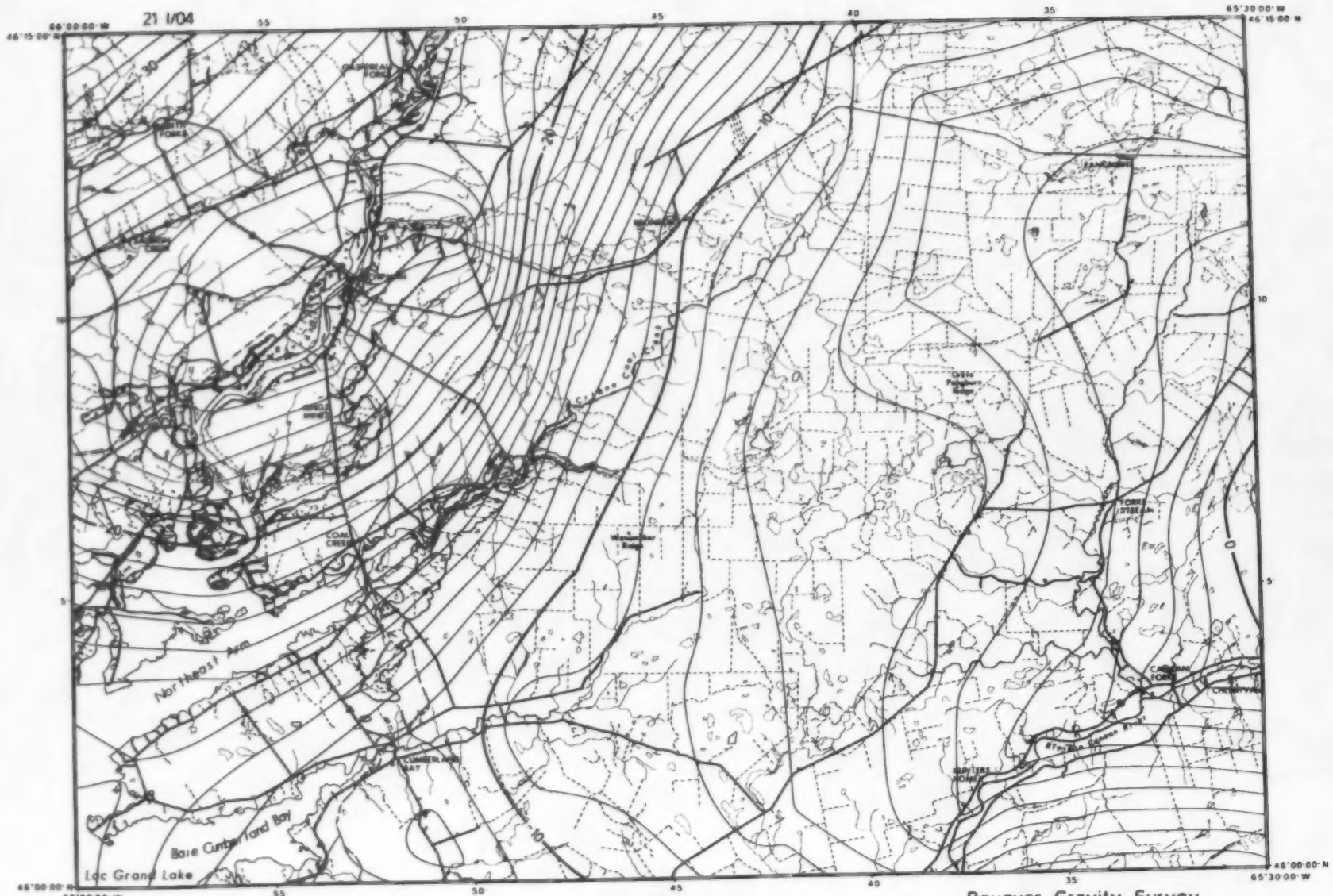
Bouguer Gravity Survey


21 I/02
Baie Shediac Bay
MONCTON
Miles
Metres
Freeair Gravity Survey

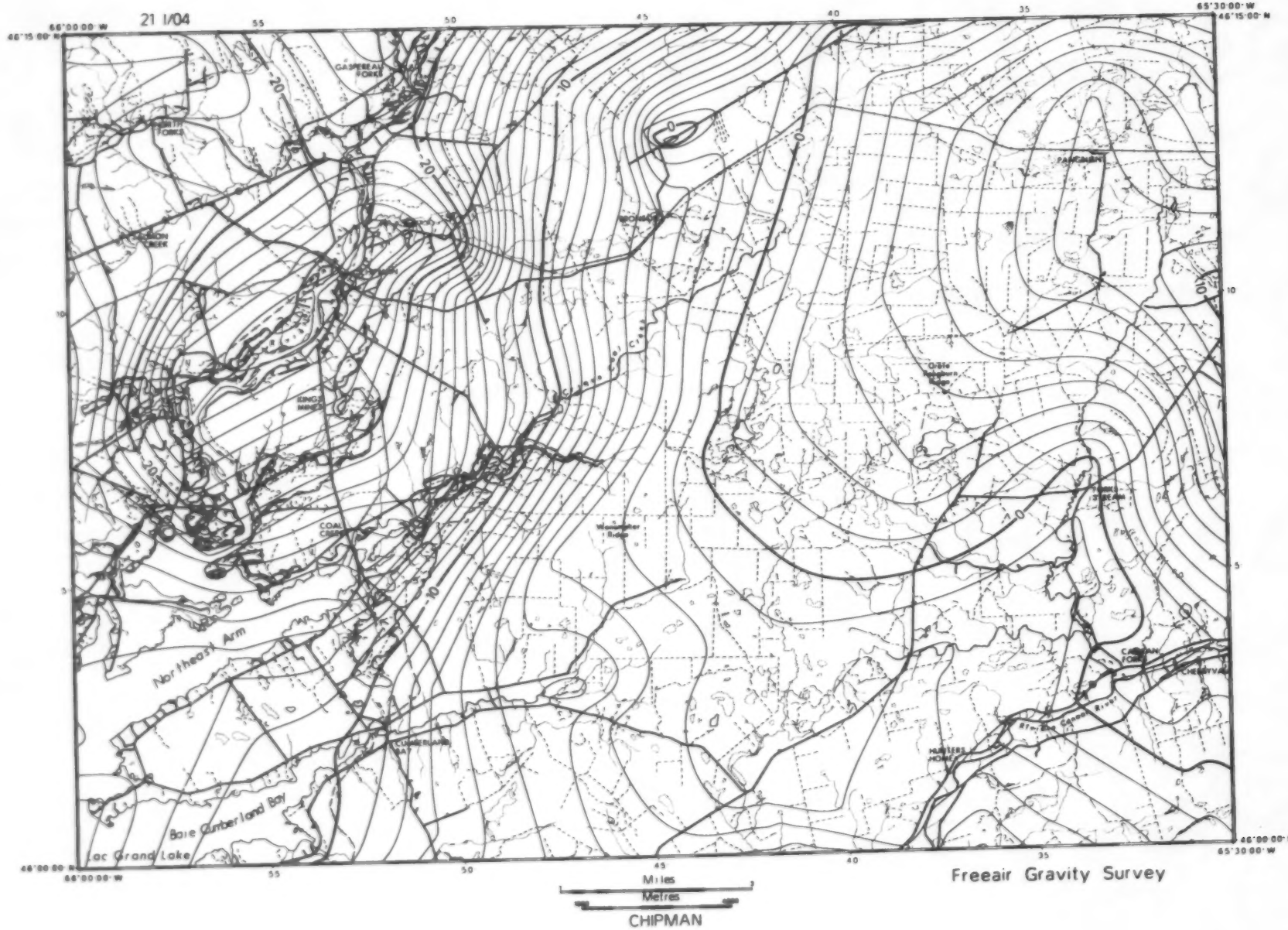

21 I/03
65°30'00"W
46°15'00"N
65°00'00"W
46°00'00"N
CANAAN RIVER
GAME MANAGEMENT AREA
ALWARD
NORTH BRANCH
-10
0
Miles
Metres
SALISBURY
Bouguer Gravity Survey

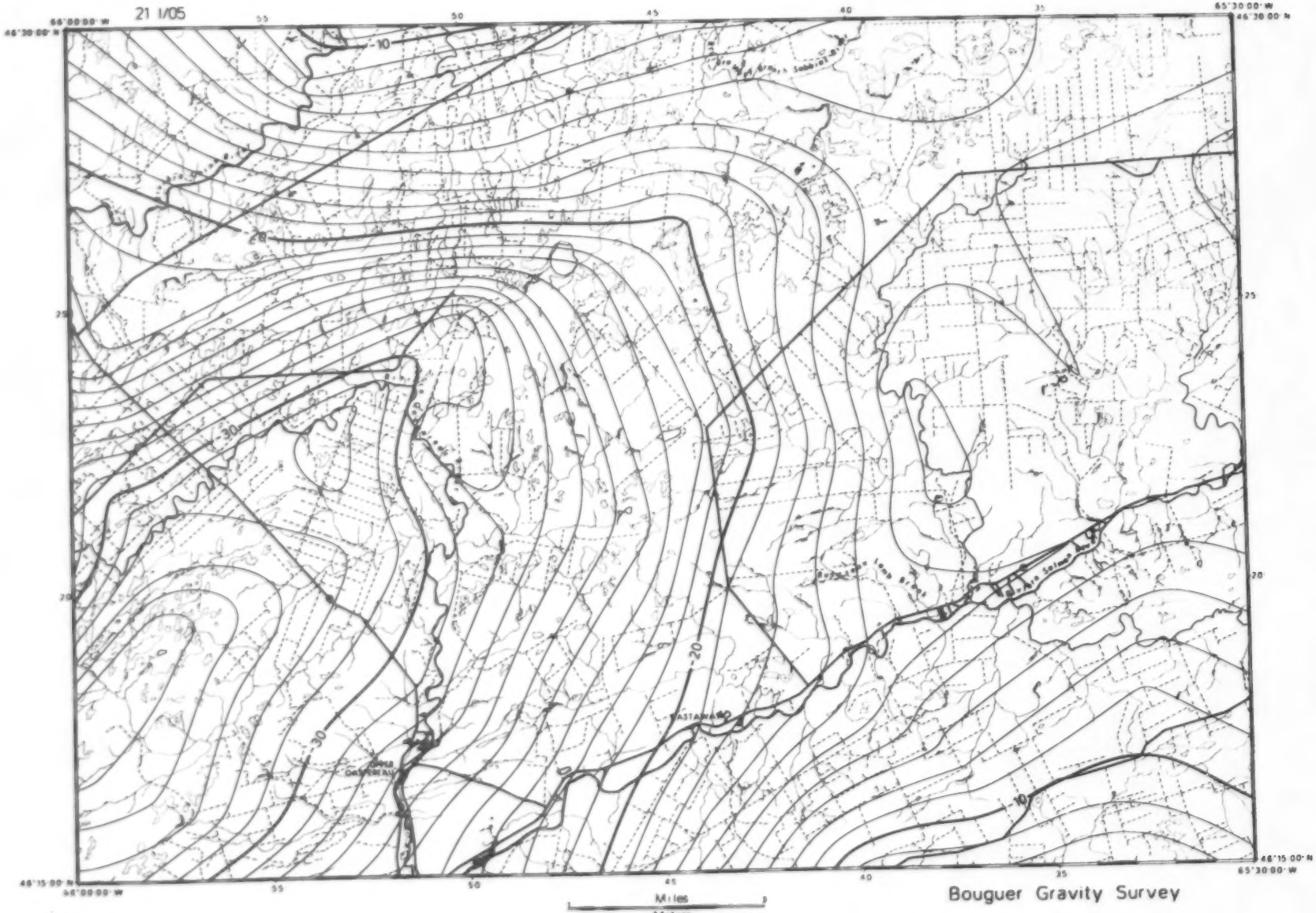


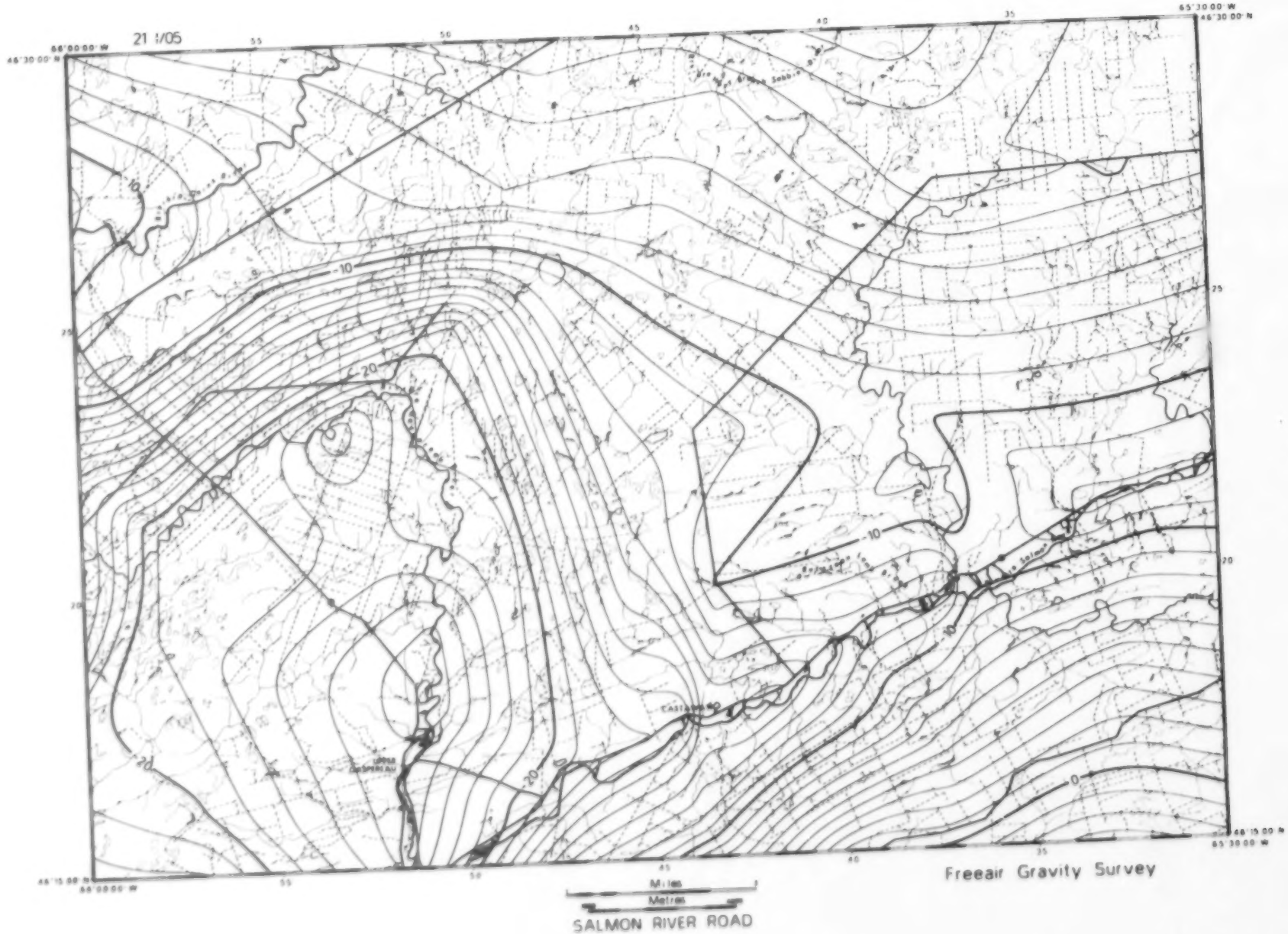
Freeair Gravity Survey

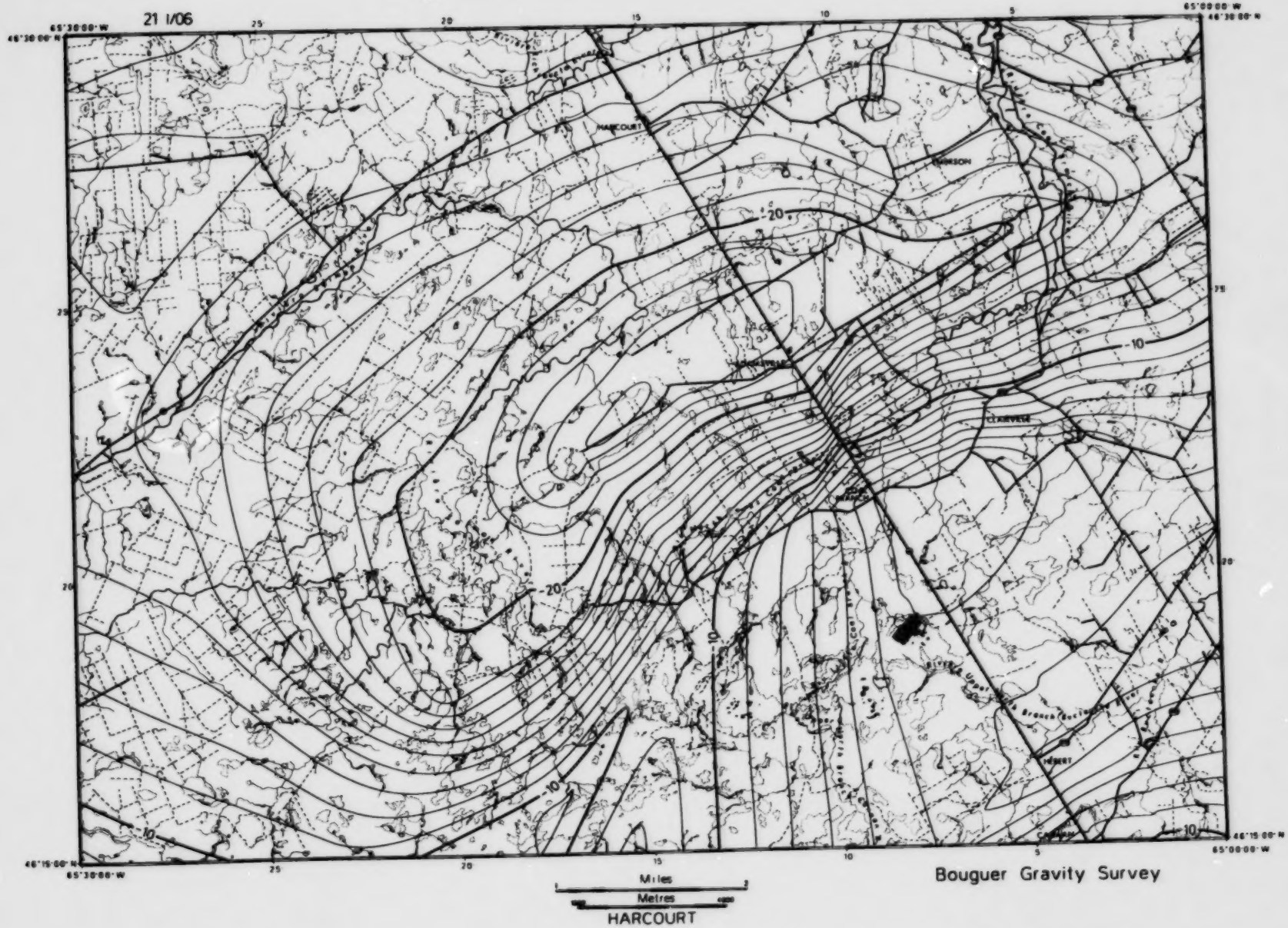


Bouguer Gravity Survey

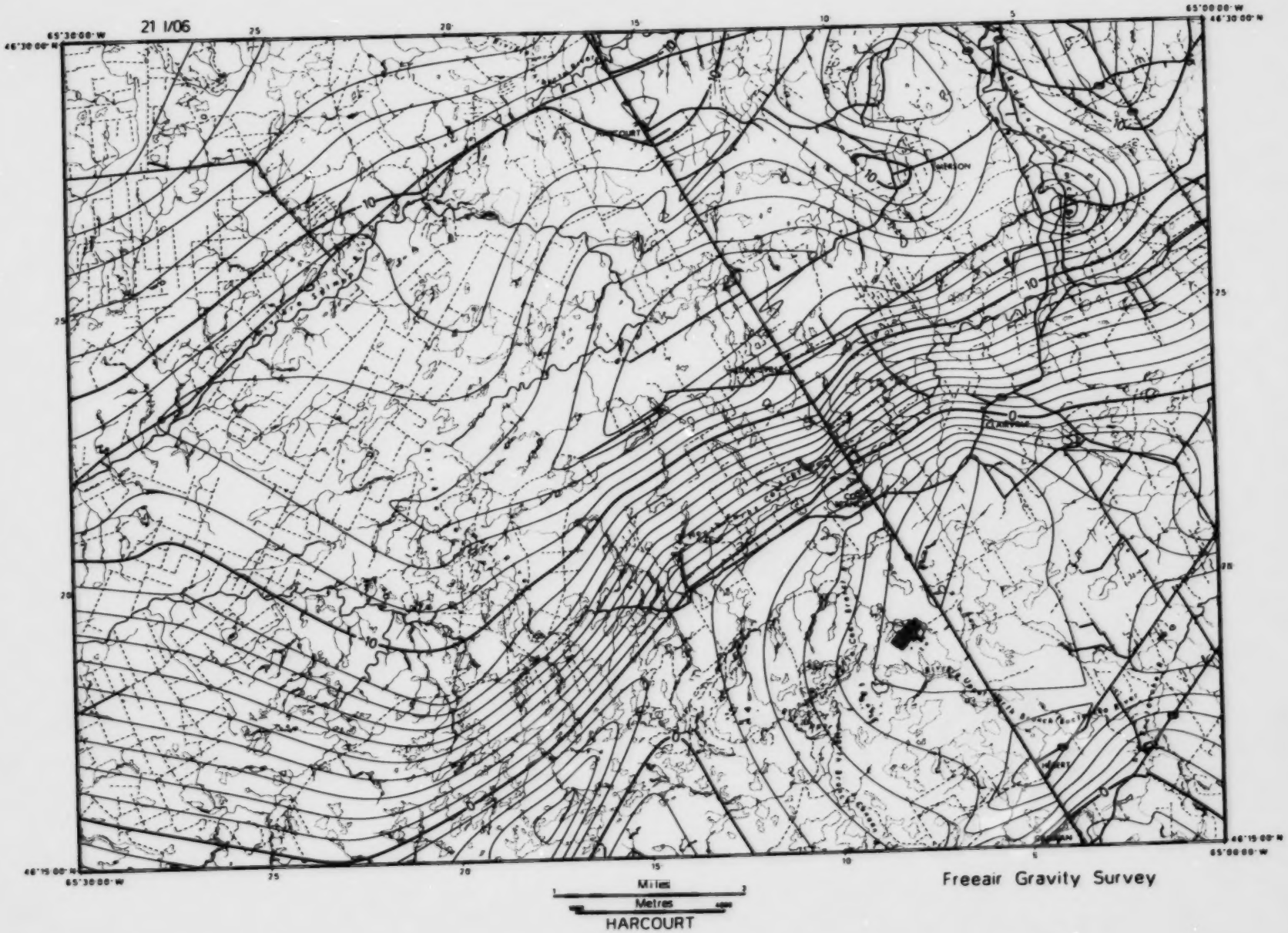

21 I/04
66°00'00" W
65°30'00" W
46°15'00" N
46°00'00" N
Northeast Arm
Baie Cumberland Bay
Lac Grand Lake
Miles
Metres
CHIPMAN
Freeair Gravity Survey


21 I/05
65°30'00"W
46°30'00"N
46°15'00"N
Miles
Metres
SALMON RIVER ROAD
Bouguer Gravity Survey

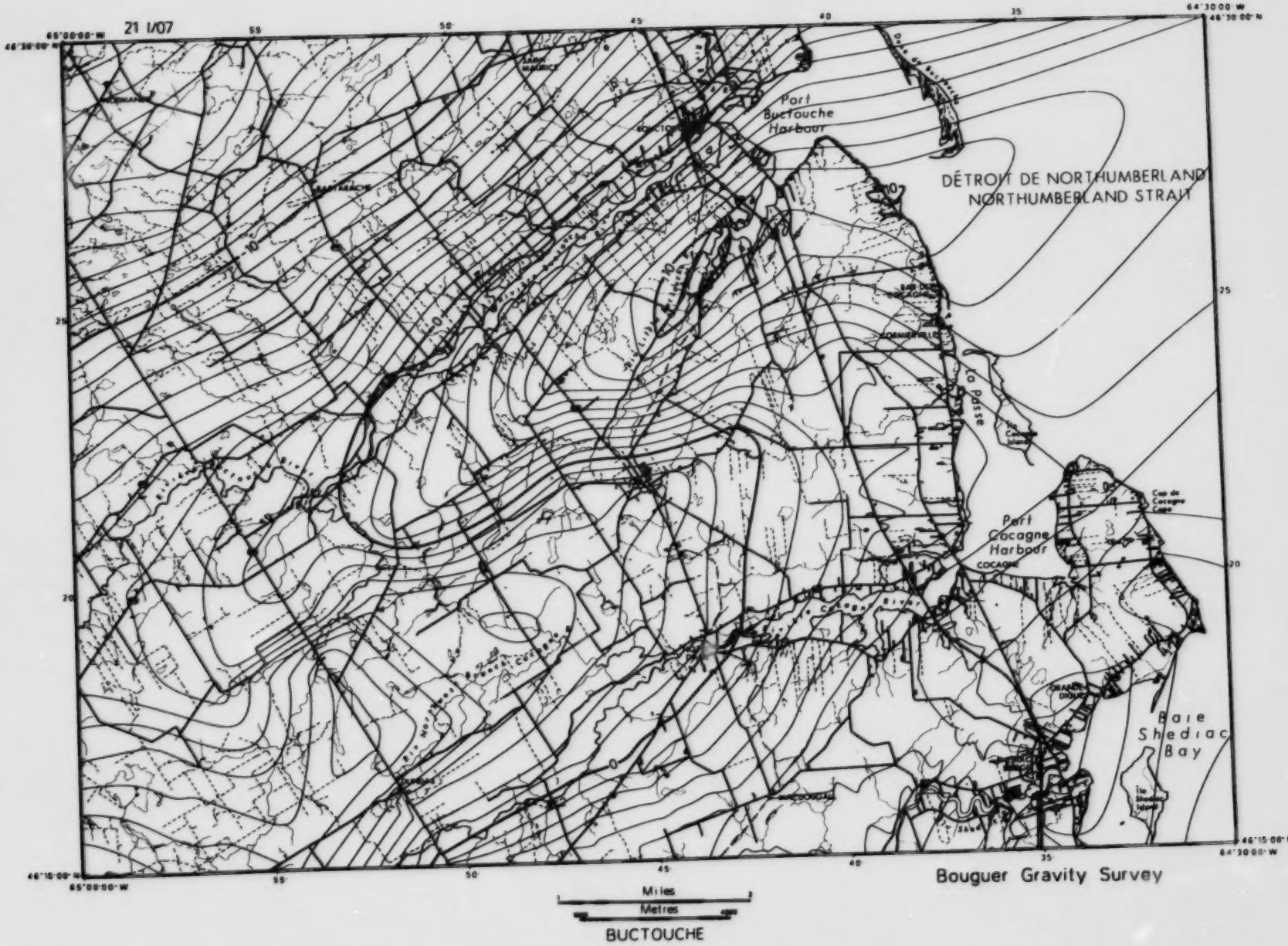

21 I/05
66°00'00" W
46°30'00" N
65°30'00" W
46°15'00" N
55
50
45
40
35
25
20
-10
-20
0
10
20
Miles
Metres
SALMON RIVER ROAD
Freeair Gravity Survey

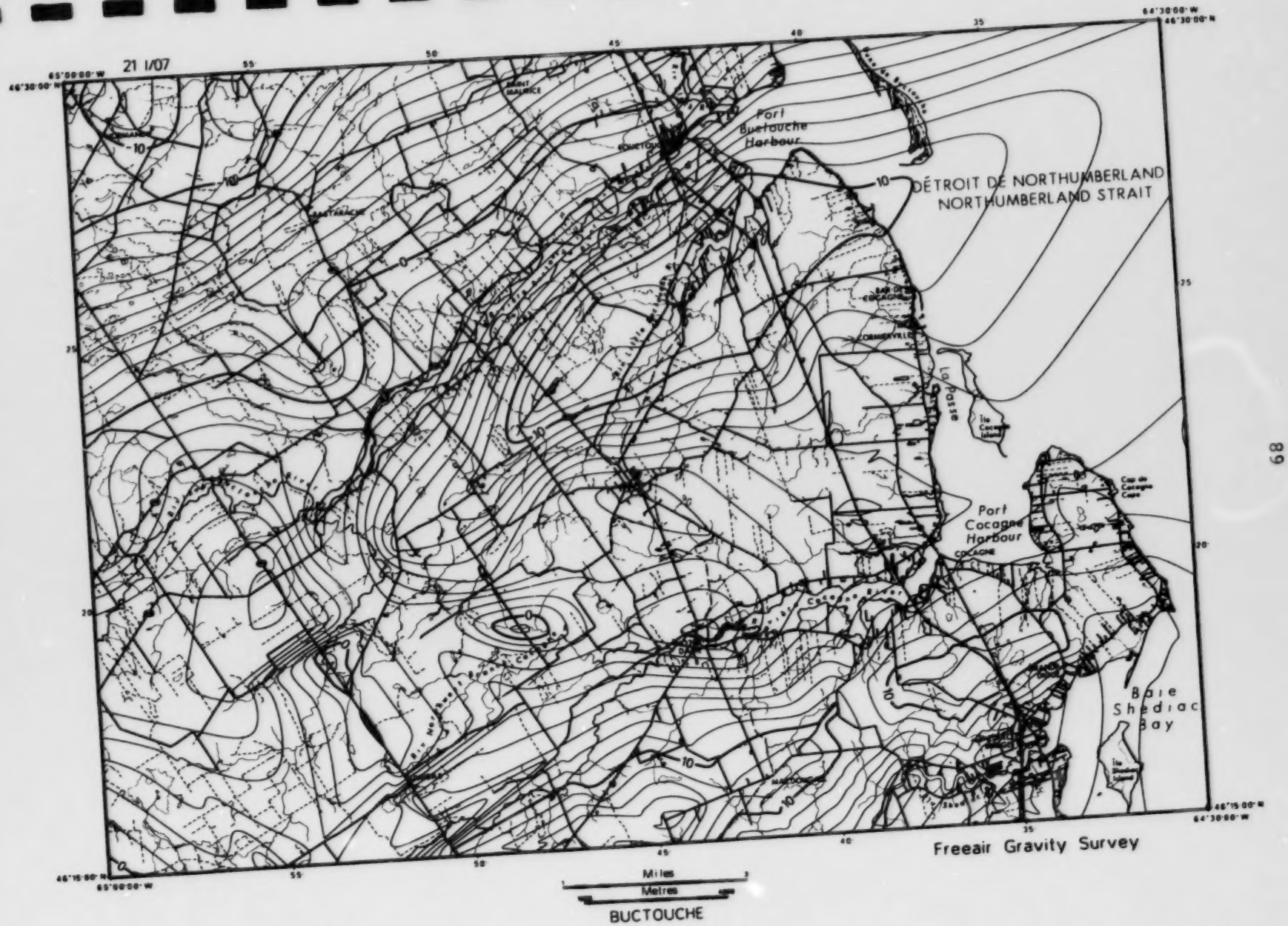


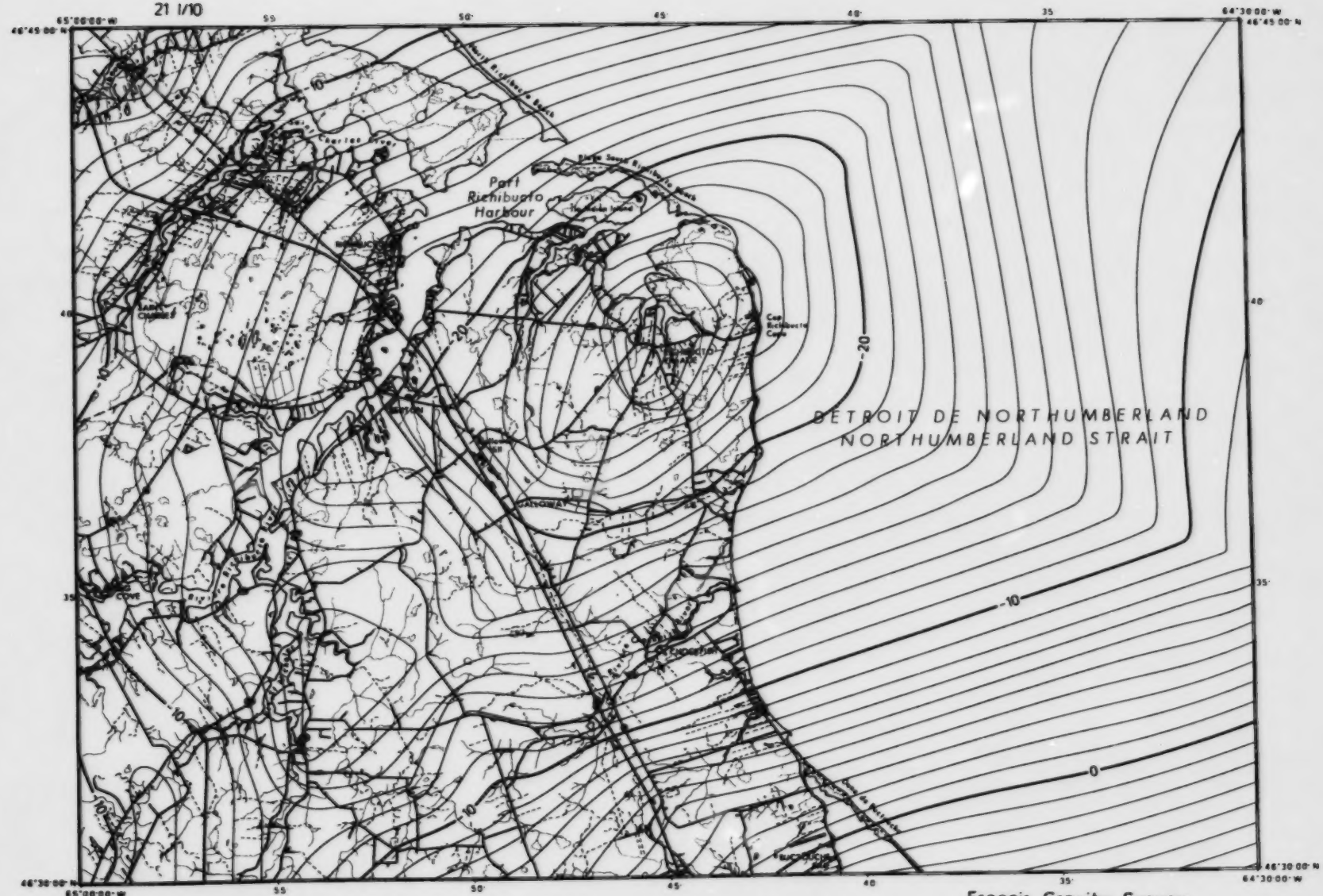
Bouguer Gravity Survey



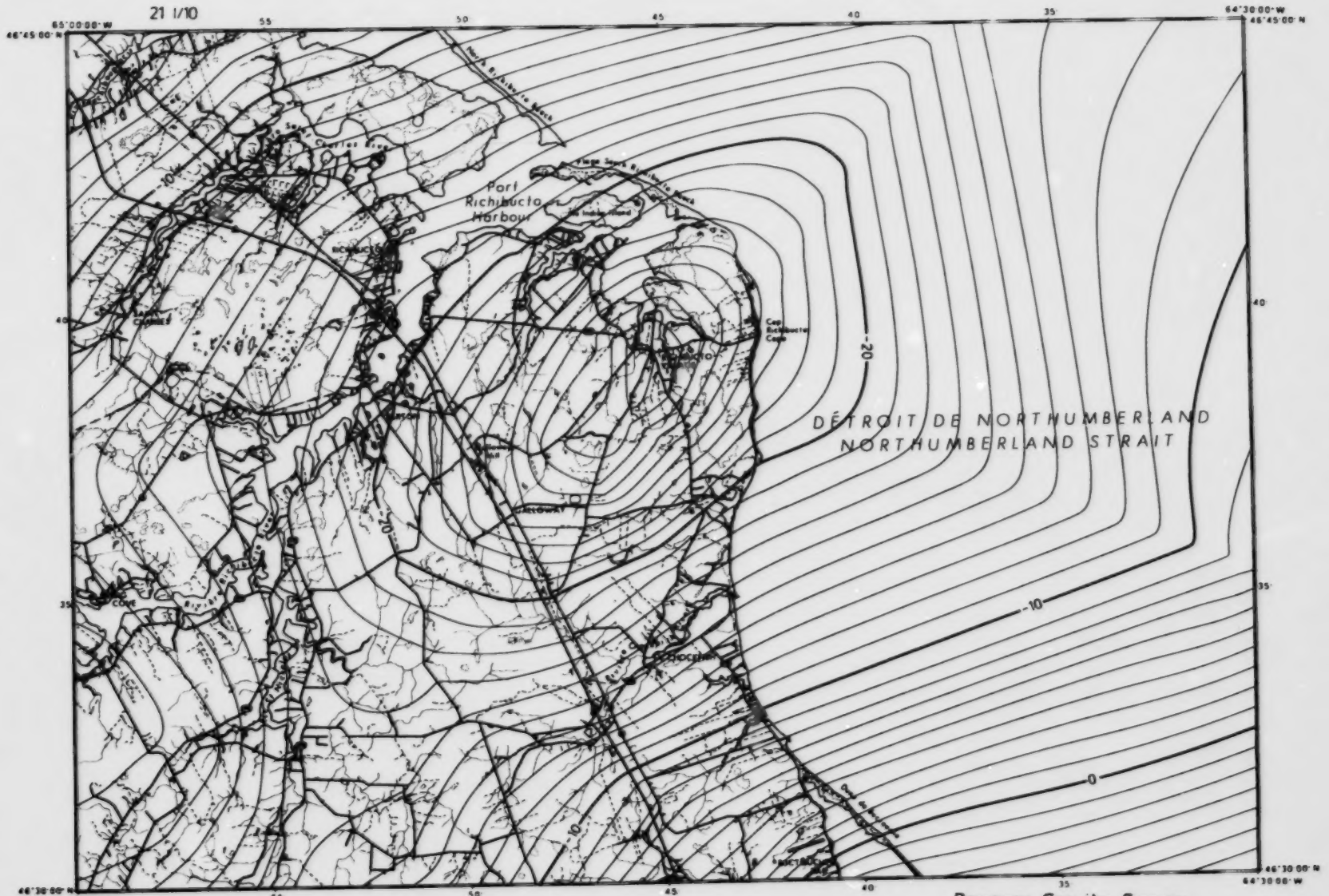
Freeair Gravity Survey

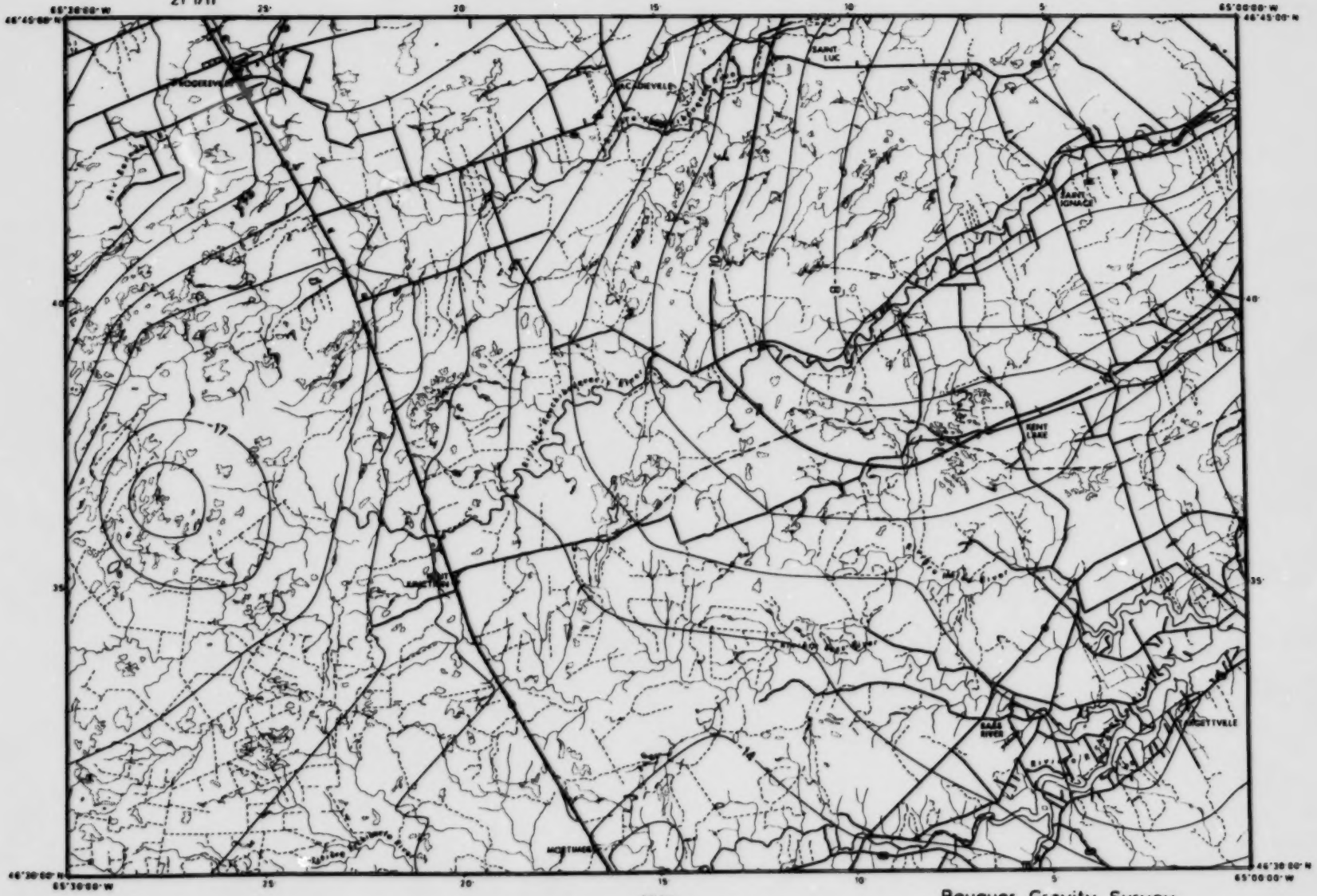

21 I/07
Port Buctouche Harbour
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
La Passe
Port Cocagne Harbour
Baie Shediac Bay
Miles
Metres
BUCTOUCHE
Bouguer Gravity Survey


21 I/07
Port Buctouche Harbour
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
La Passe
Port Cocagne Harbour
Baie Shediac Bay
Miles
Metres
BUCTOUCHE
Freeair Gravity Survey

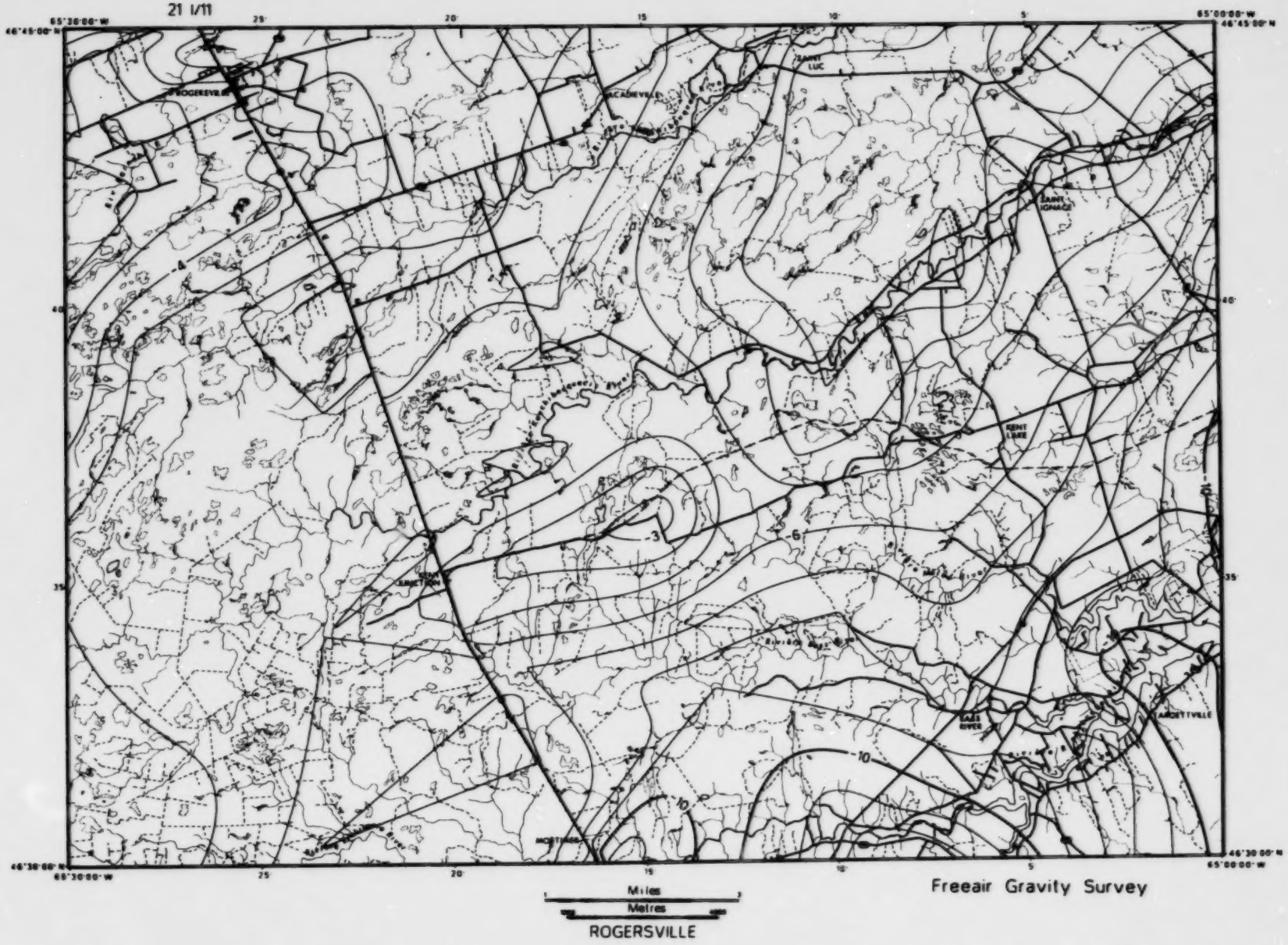


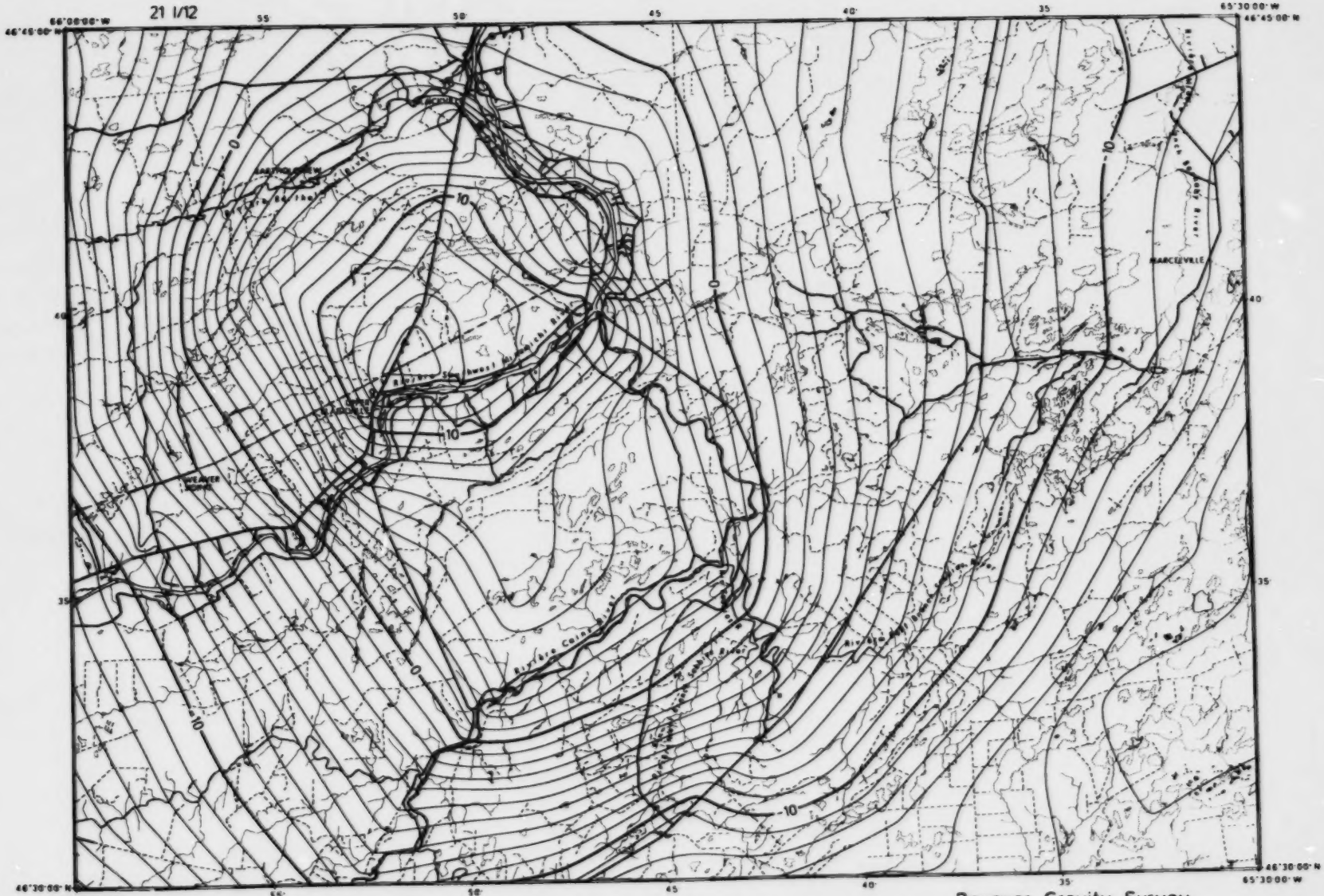
Freeair Gravity Survey


21 I/10
65°00'00" W
46°45'00" N
64°30'00" W
46°30'00" N
55
50
45
40
35
Port Richibucto Harbour
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
-20
-10
0
Miles
Metres
RICHIBUCTO
Bouguer Gravity Survey



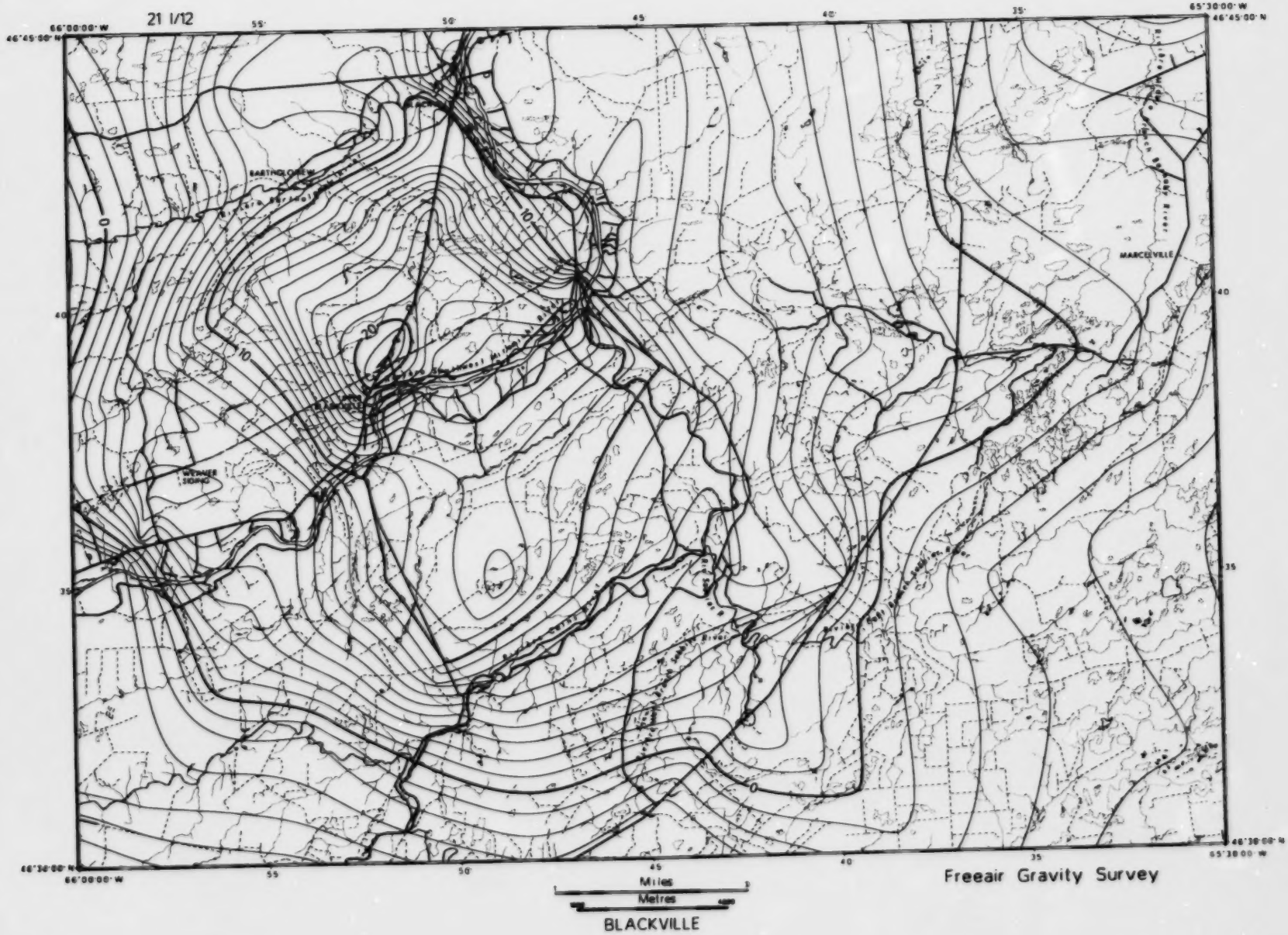
Bouguer Gravity Survey

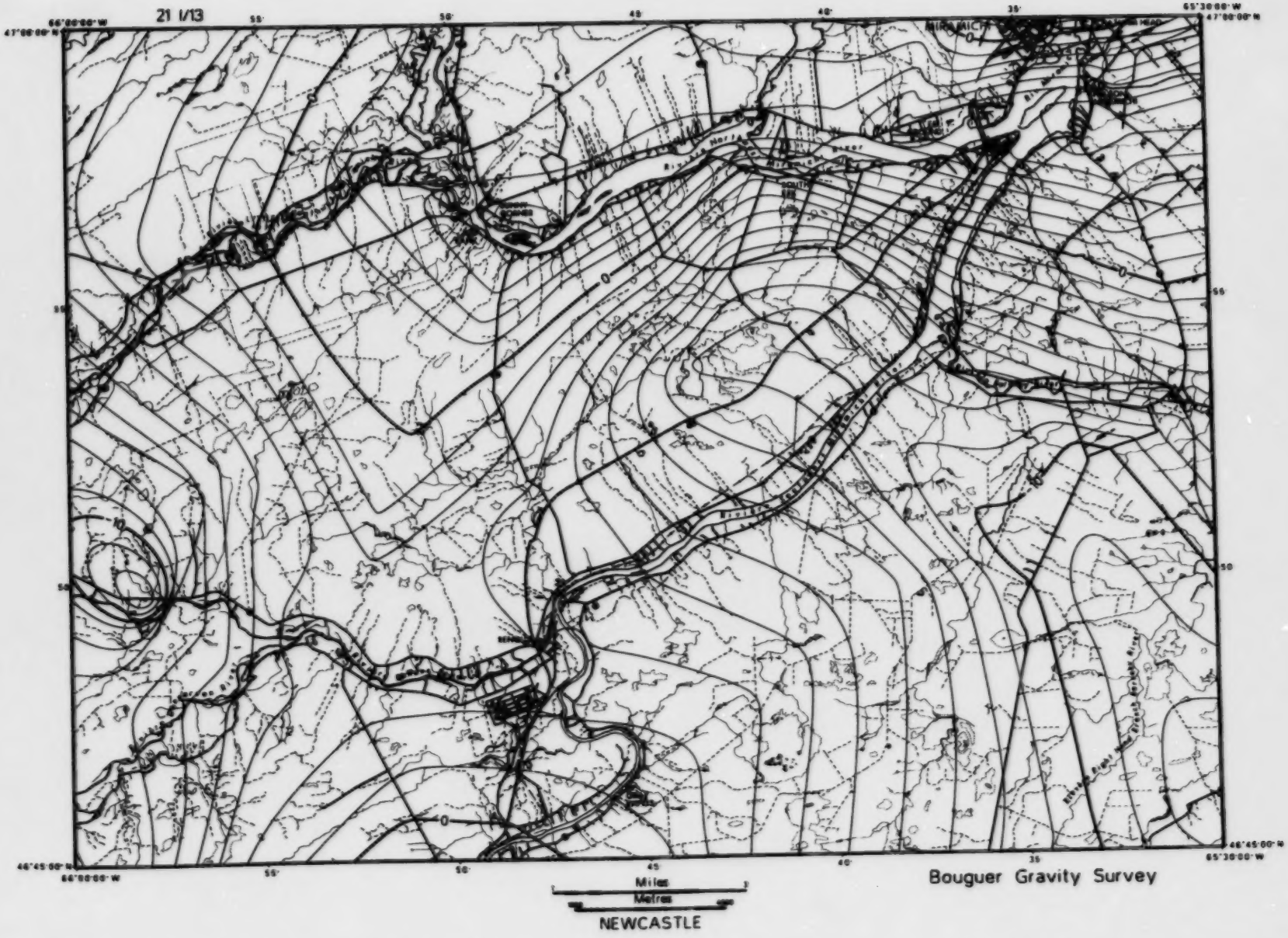

21 I/11
65°30'00"W
65°00'00"W
46°45'00"N
46°30'00"N
25'
20'
15'
10'
5'
ROGERSVILLE
CACAHEVILLE
SAINT LUC
SAINT JOSEPH
RIVIERE LEPAGE
ARMSTRONG
LAKE RIVER
ARCHETTVILLE
MONTMAGNY
-3
-6
-10
10
Miles
Metres
ROGERSVILLE
Freeair Gravity Survey



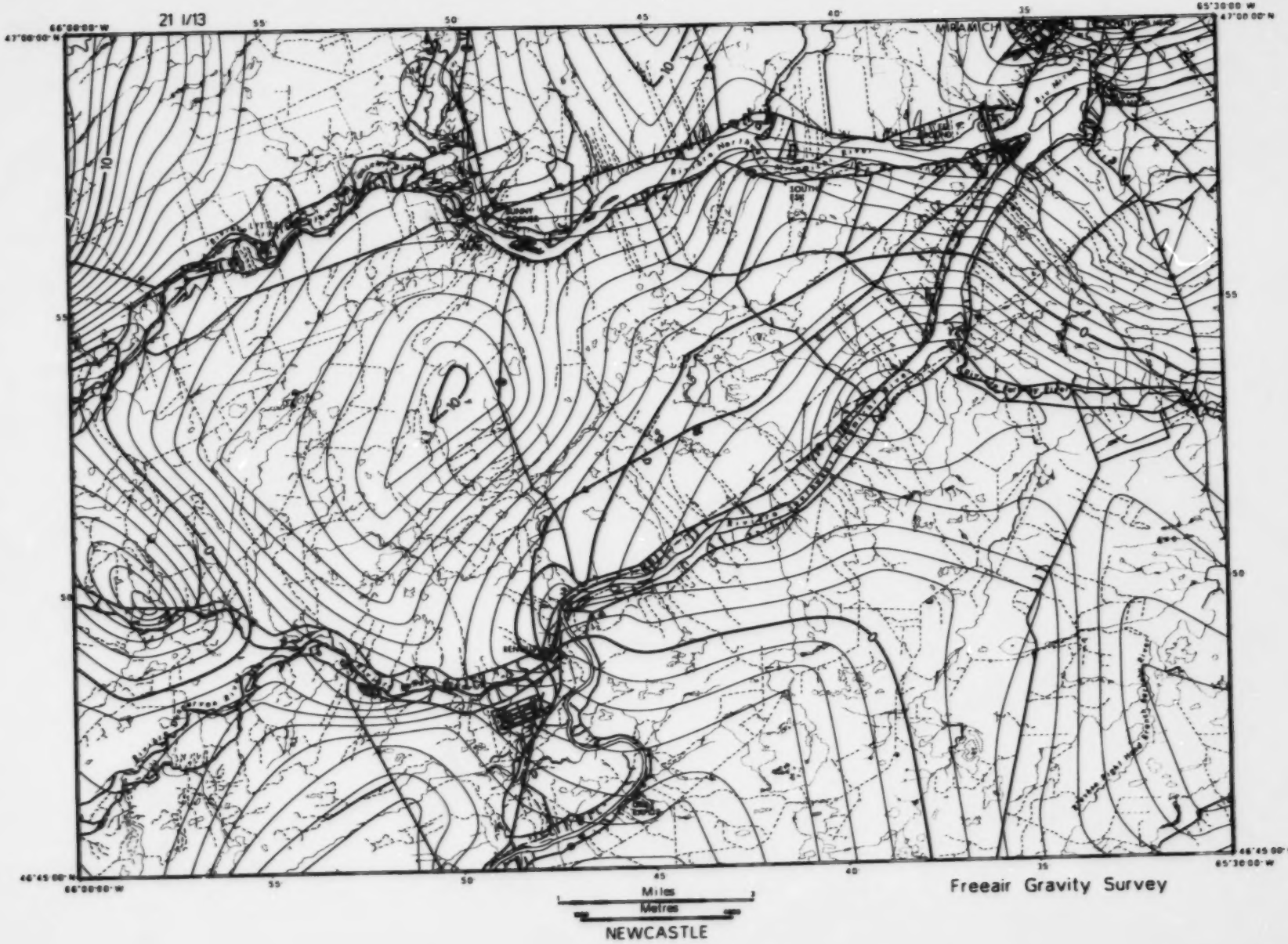
Bouguer Gravity Survey

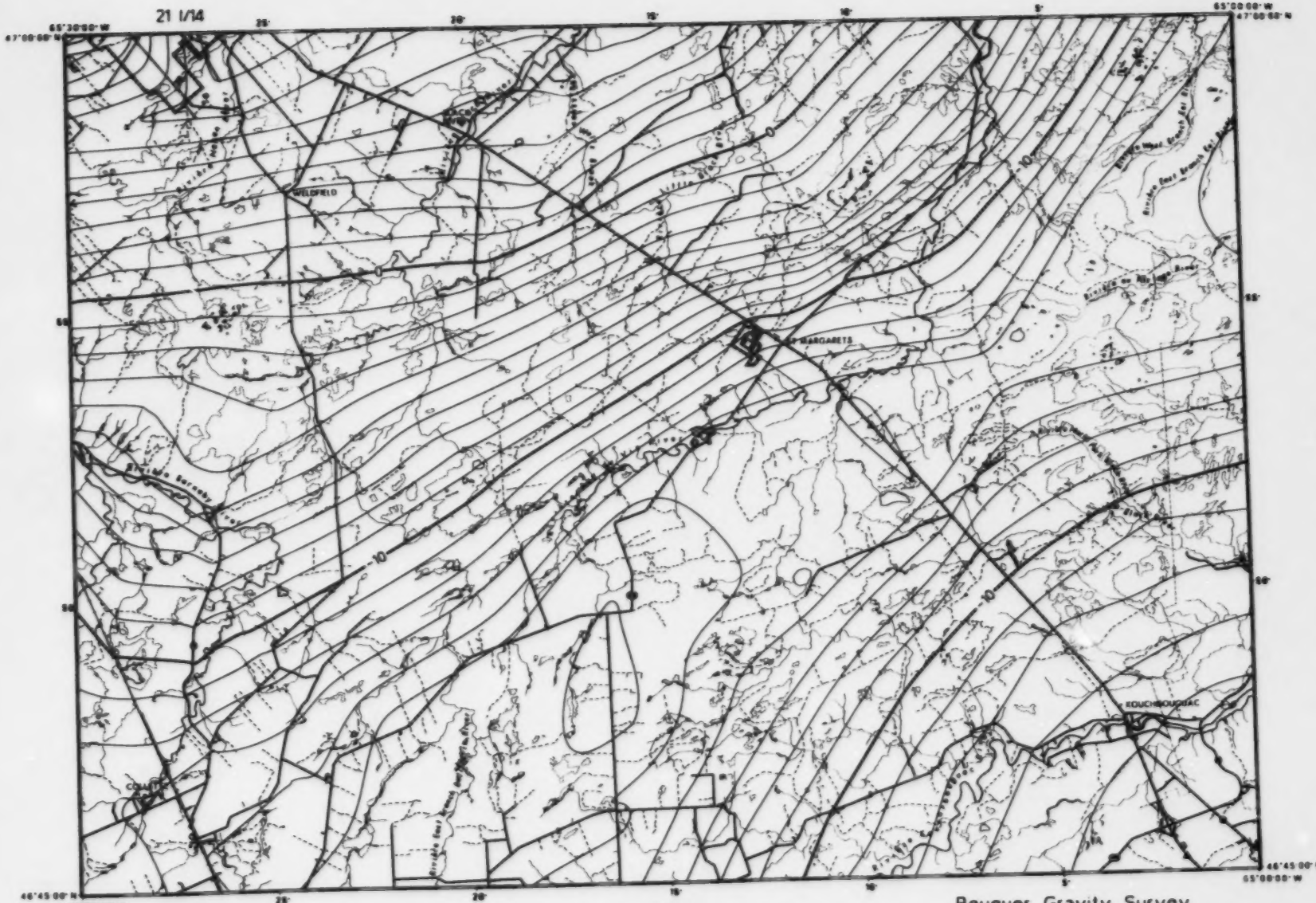
BLACKVILLE


21 I/12
66°00'00" W
65°30'00" W
46°45'00" N
46°30'00" N
55'
50'
45'
40'
35'
0
10
20
BARTHOLOMEW
MARCELVILLE
WEMMER STOMO
Miles
Metres
BLACKVILLE
Freeair Gravity Survey

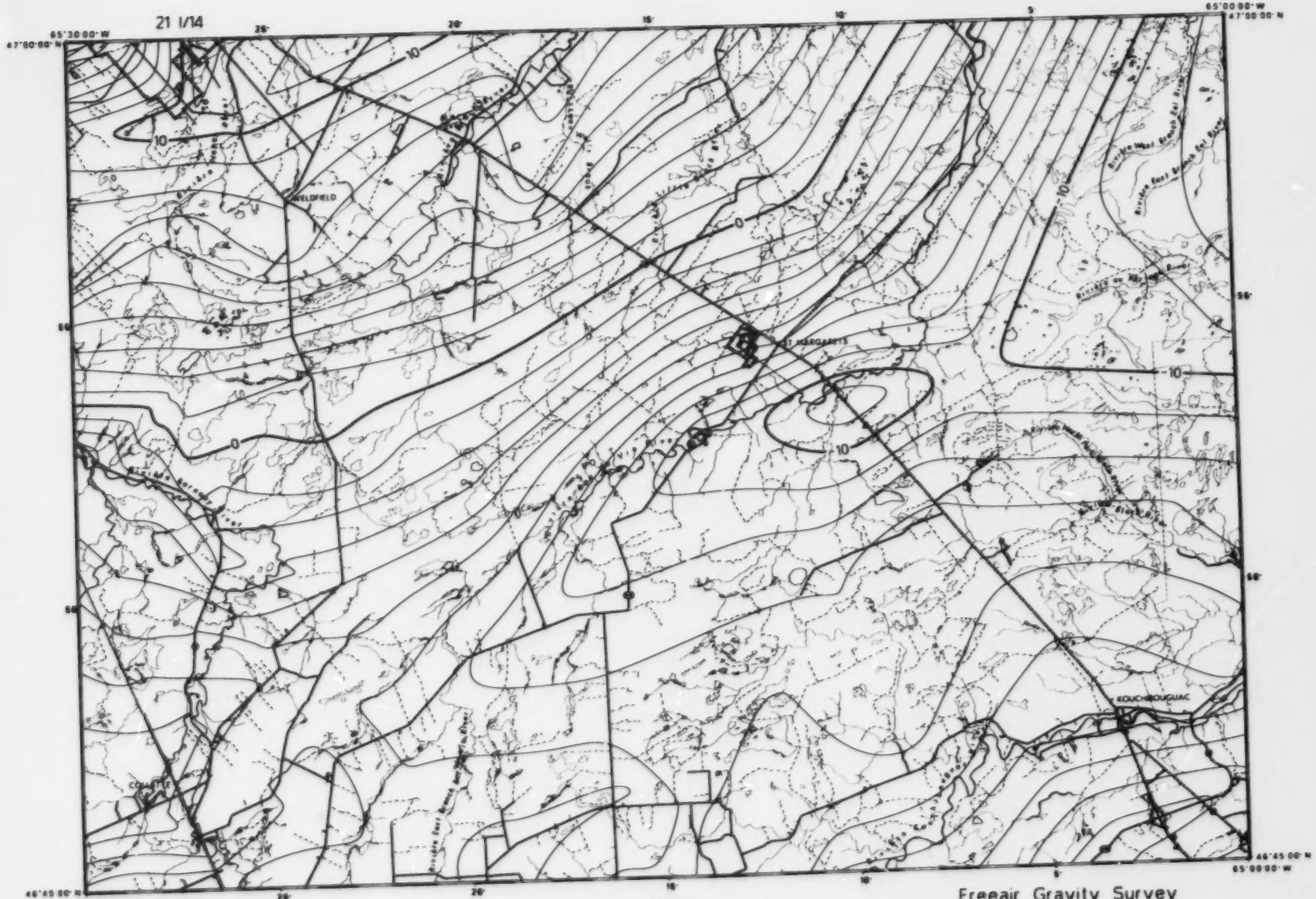


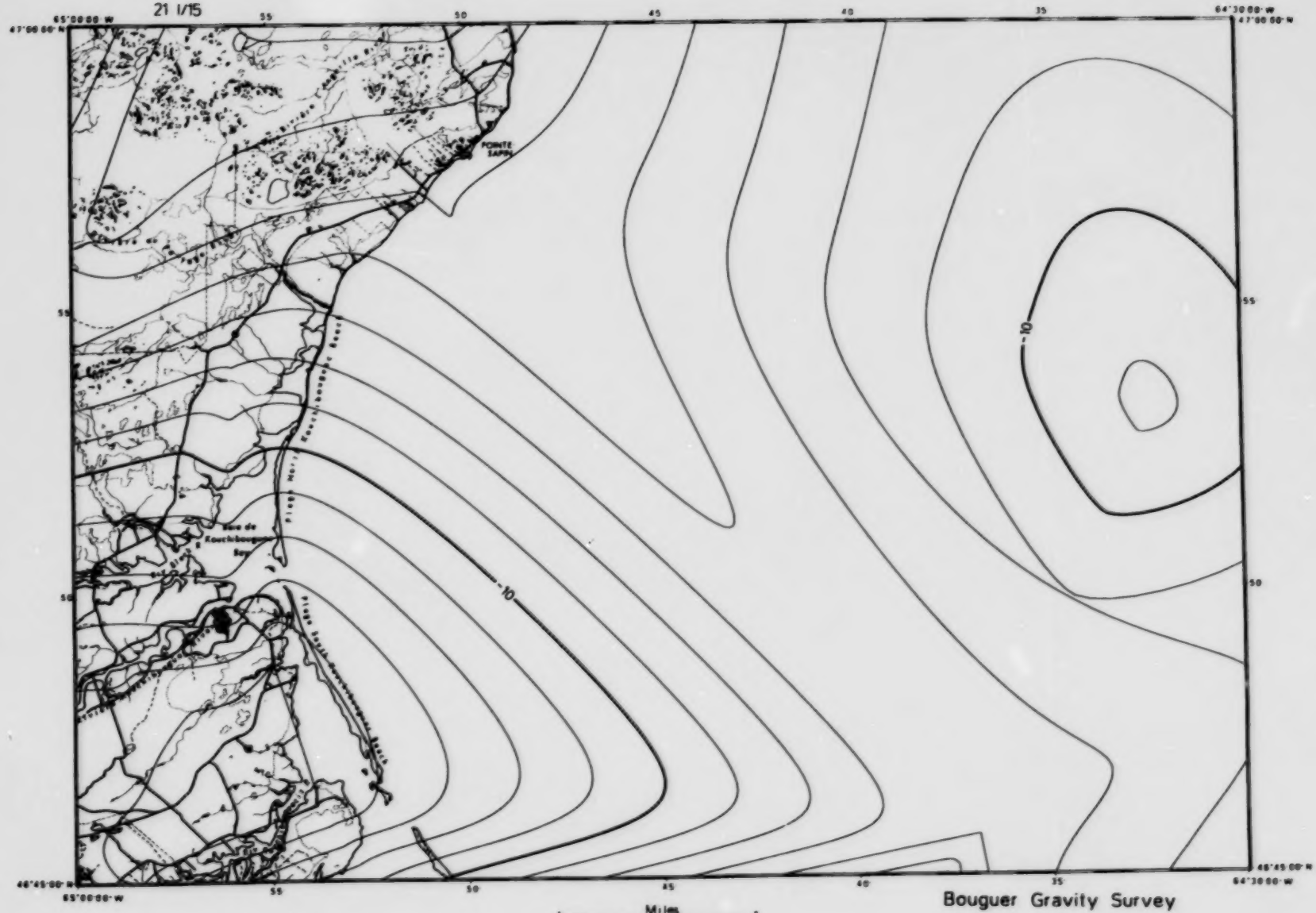
Bouguer Gravity Survey


21 I/13
MIRAMICHI
NEWCASTLE
Miles
Metres
Freeair Gravity Survey

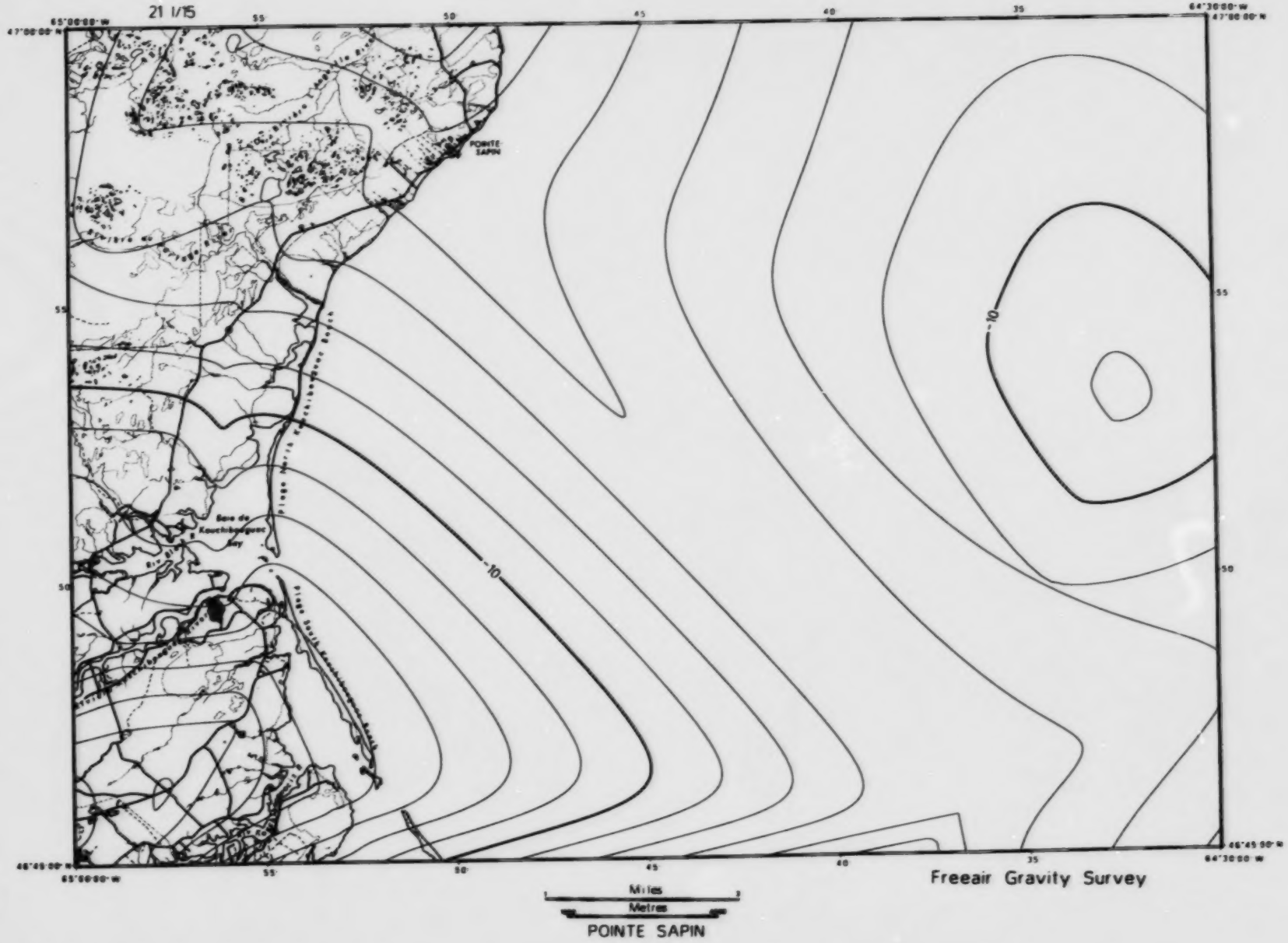


Bouguer Gravity Survey


21 I/14
65°30'00" W
47°00'00" N
65°00'00" W
46°45'00" N
ST MARGARETS
KOUCHIBOUGUAC
Miles
Metres
KOUCHIBOUGUAC
Freeair Gravity Survey



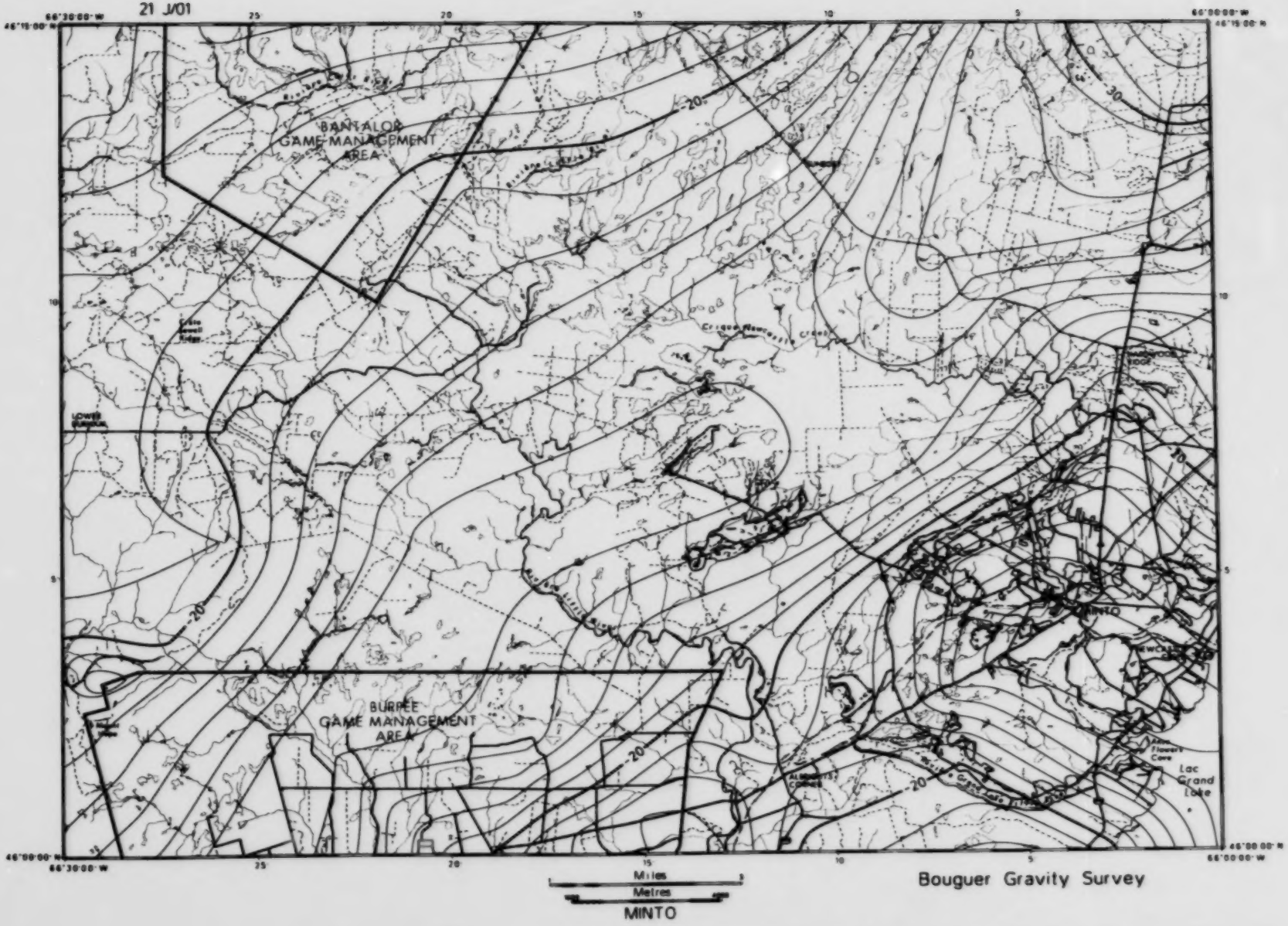
Bouguer Gravity Survey



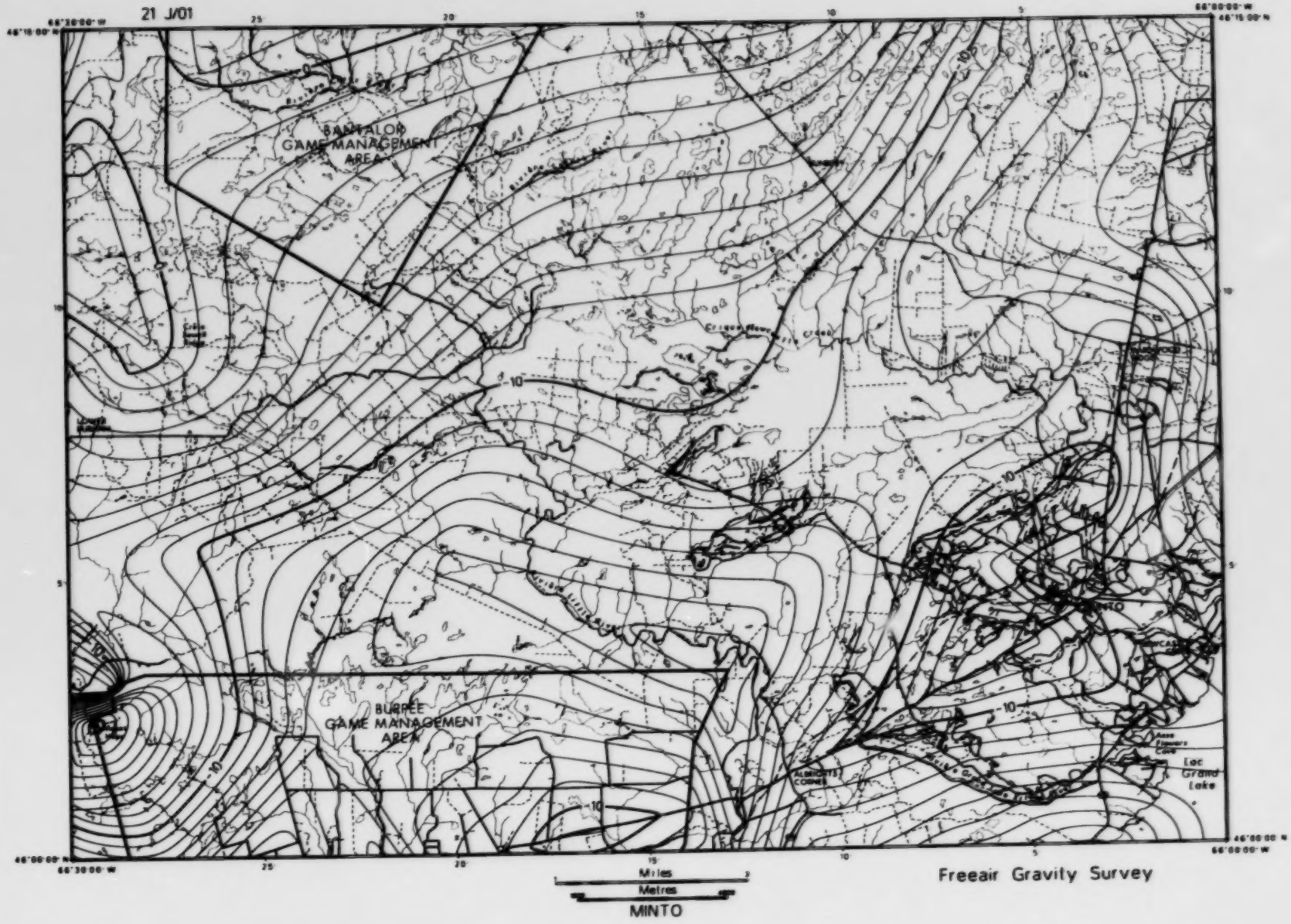
Miles
Metres

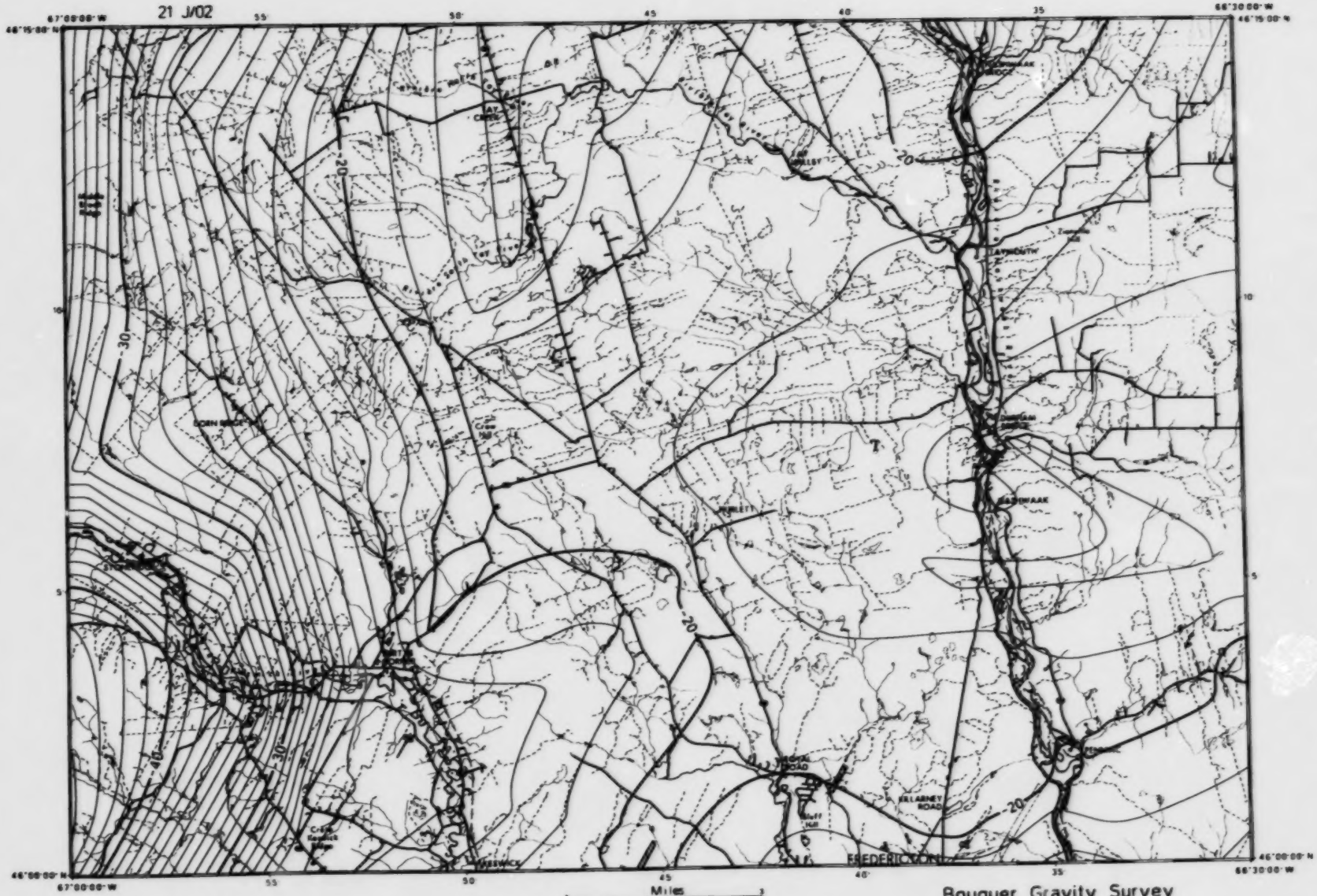
POINTE SAPIN

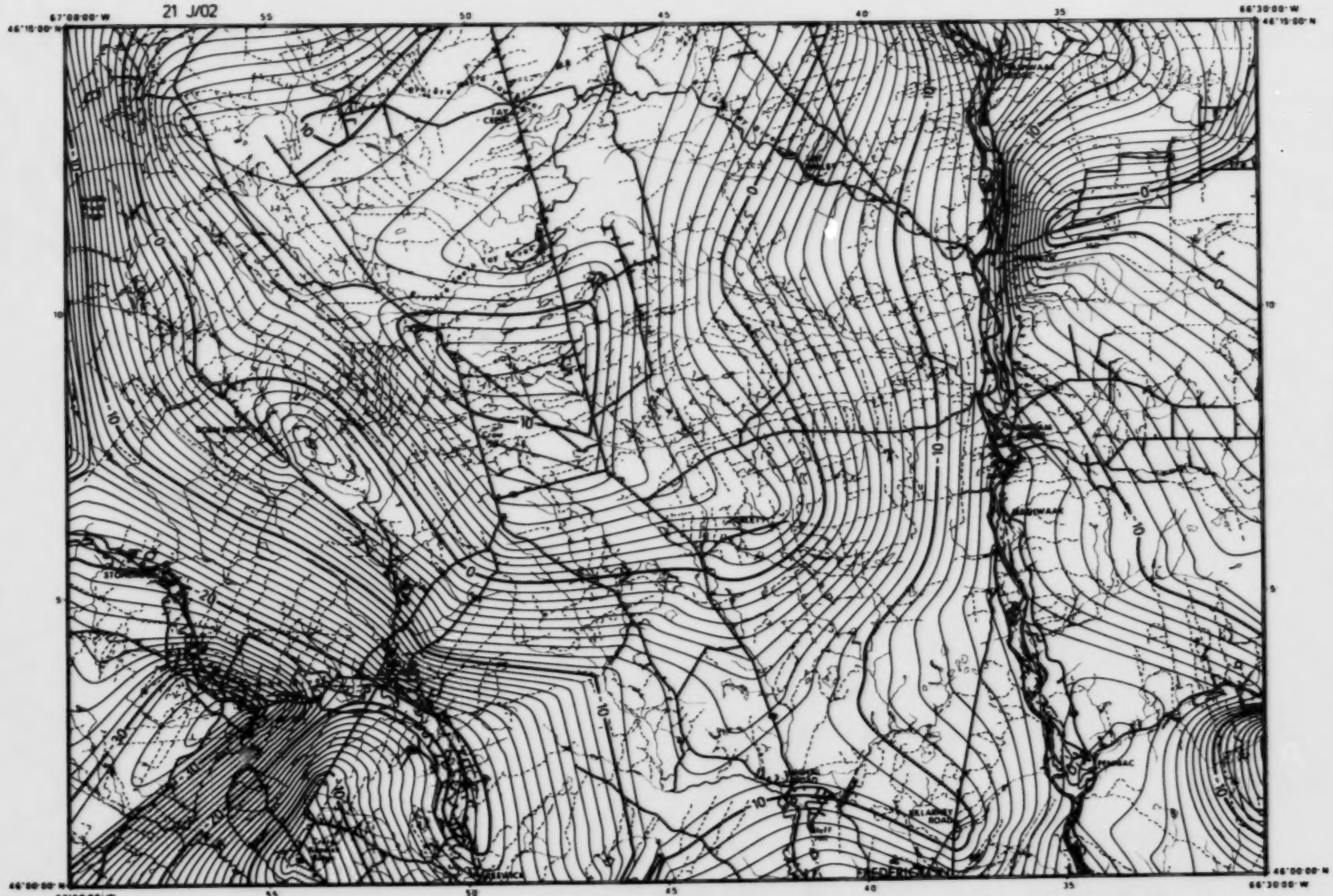
Freeair Gravity Survey

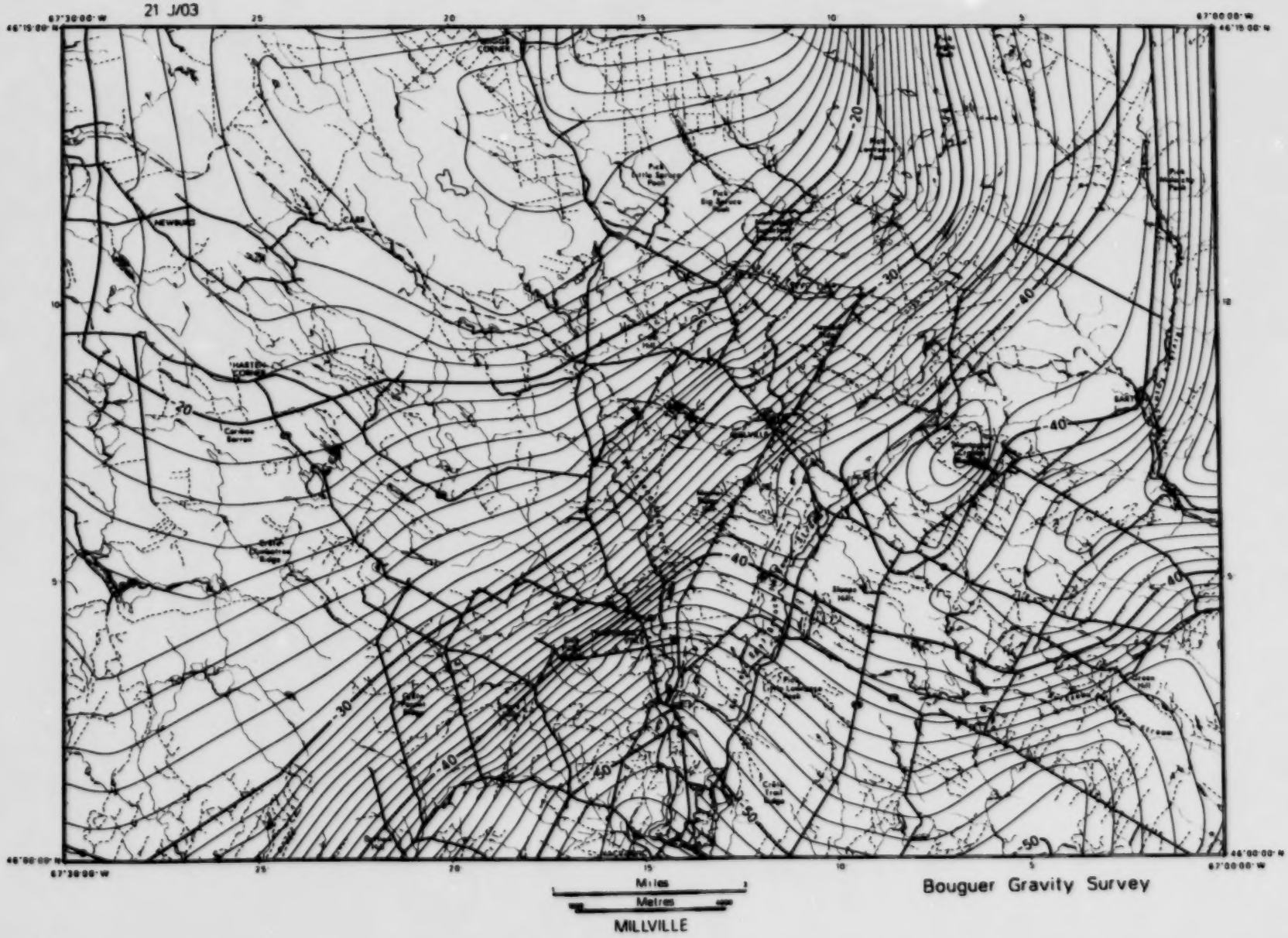


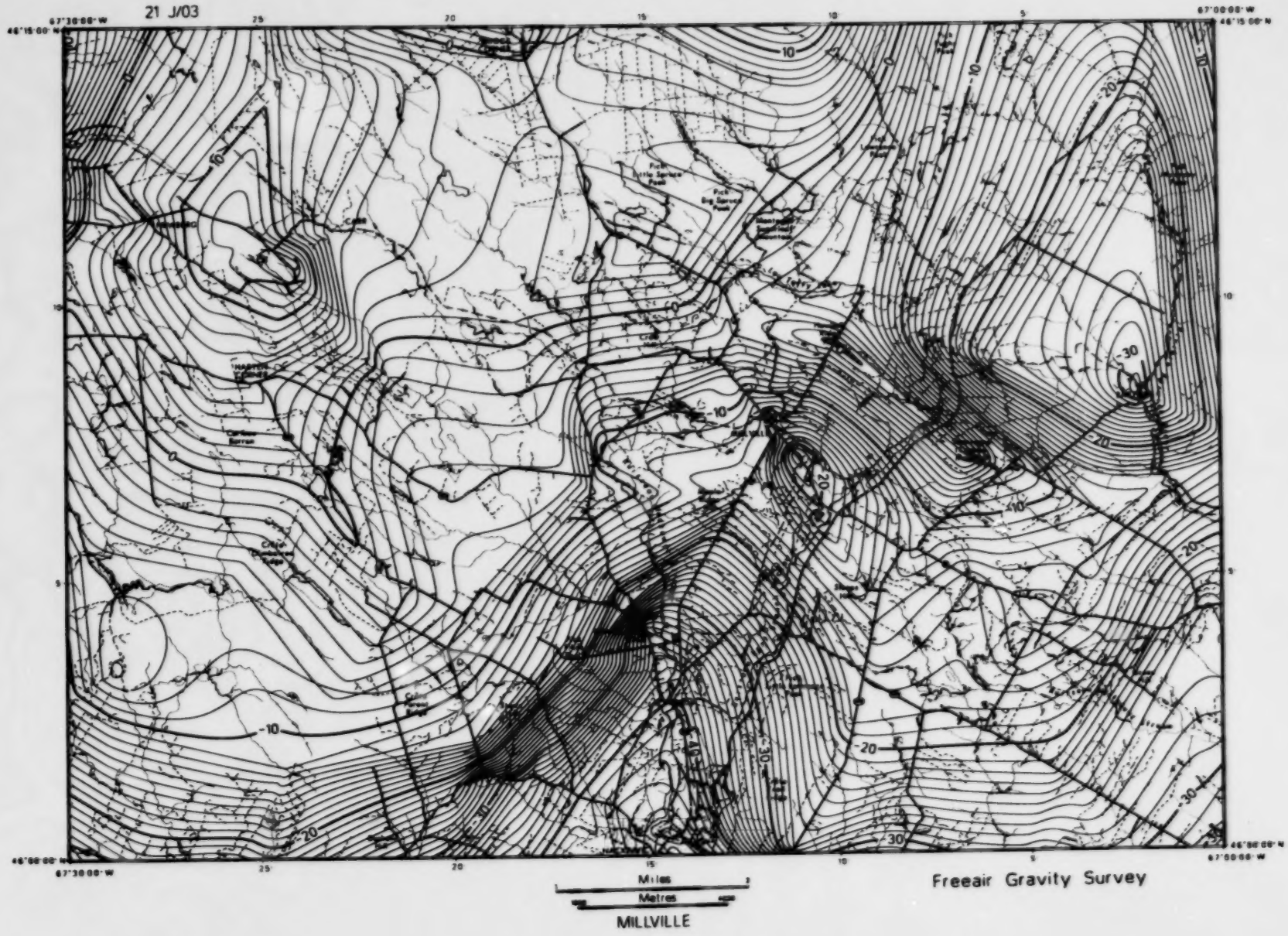
Bouguer Gravity Survey

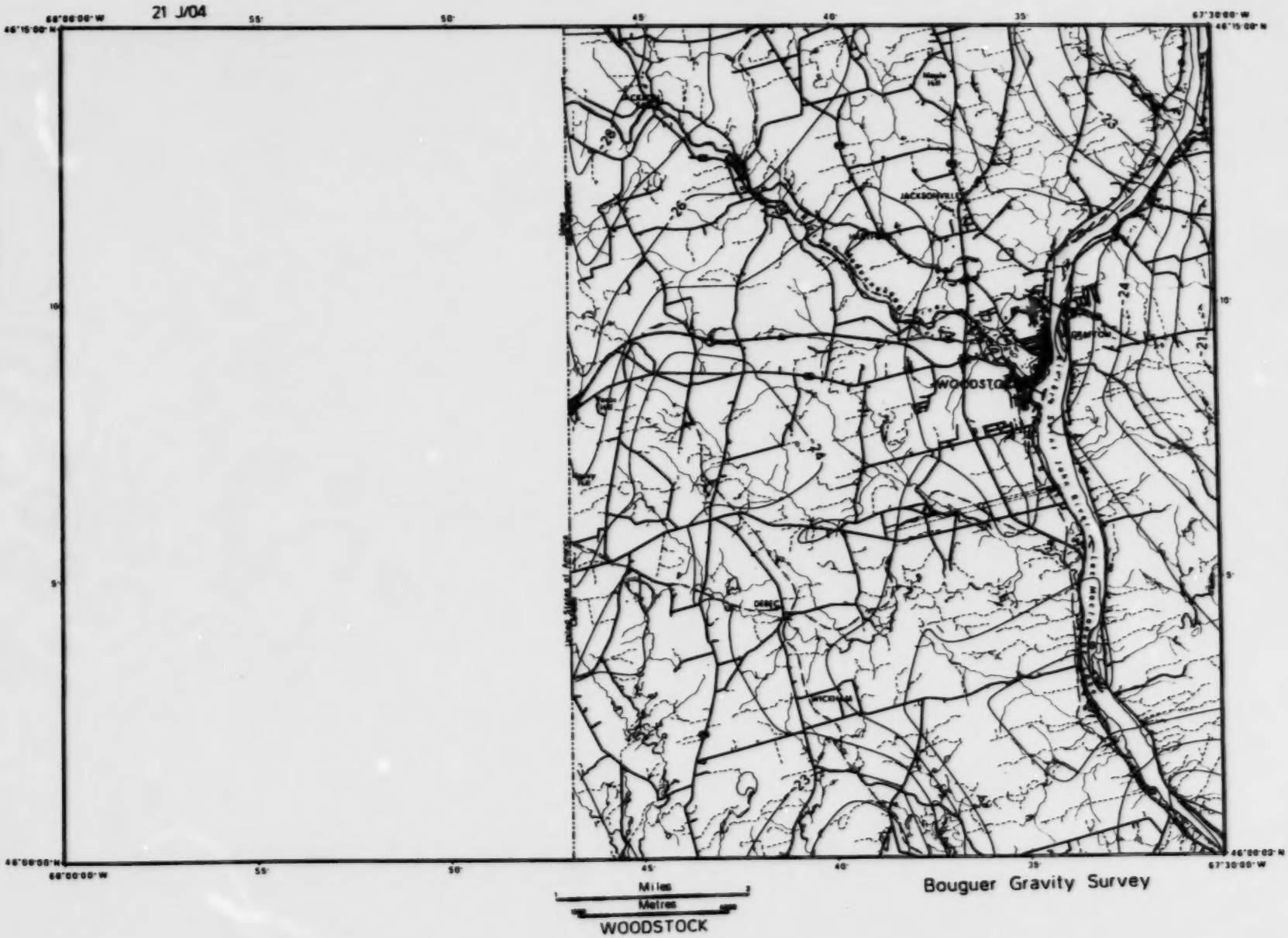

21 J/01
BANTALOR GAME MANAGEMENT AREA
BURPEE GAME MANAGEMENT AREA
Lac Grand Lake
Miles
Metres
MINTO
Freeair Gravity Survey

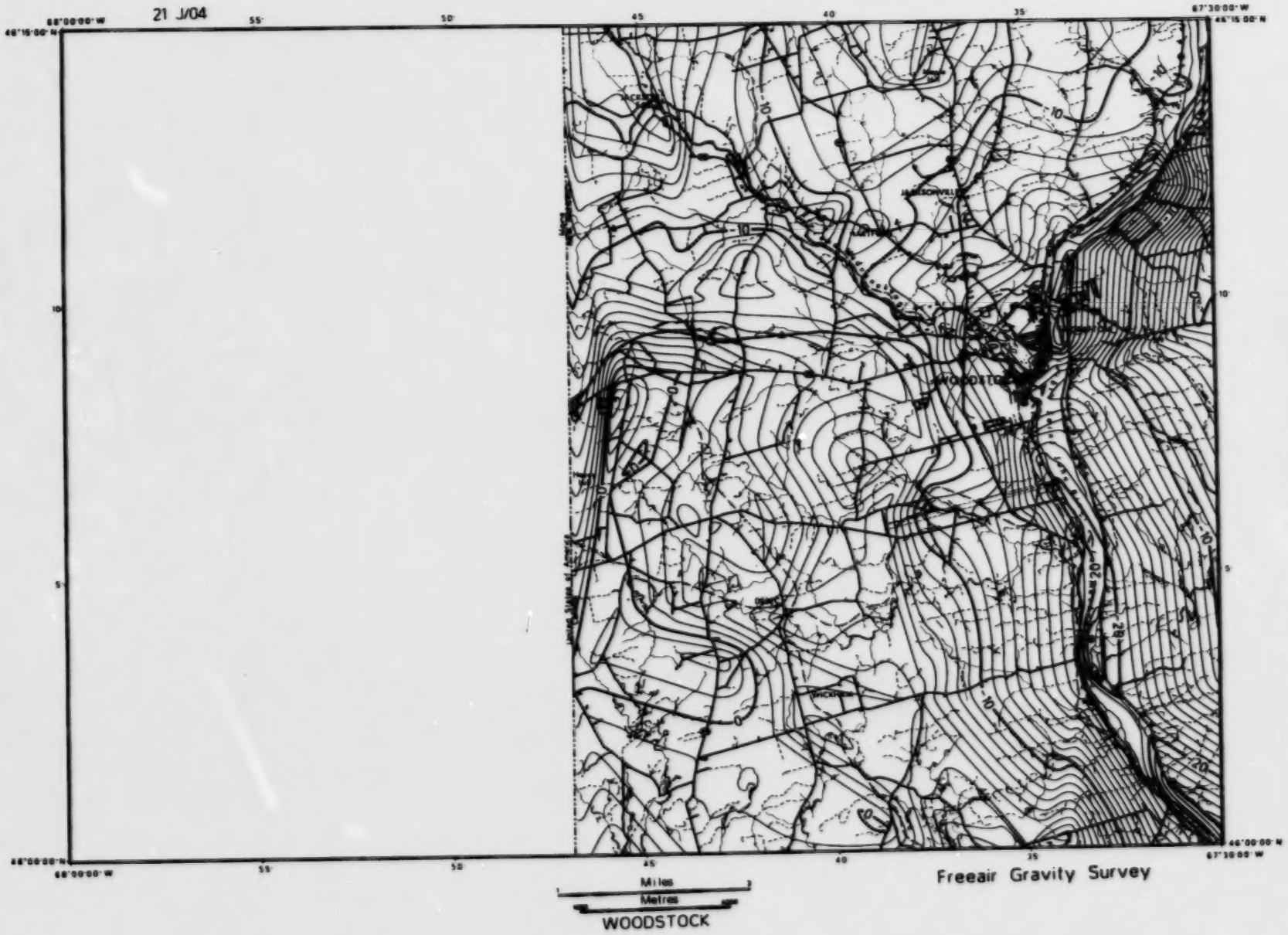

21 JV02
67°00'00" W
46°15'00" N
55'
50'
45'
40'
35'
66°30'00" W
-20
-30
-40
FREDERICTON
Miles
Metres
BURTTS CORNER
Bouguer Gravity Survey

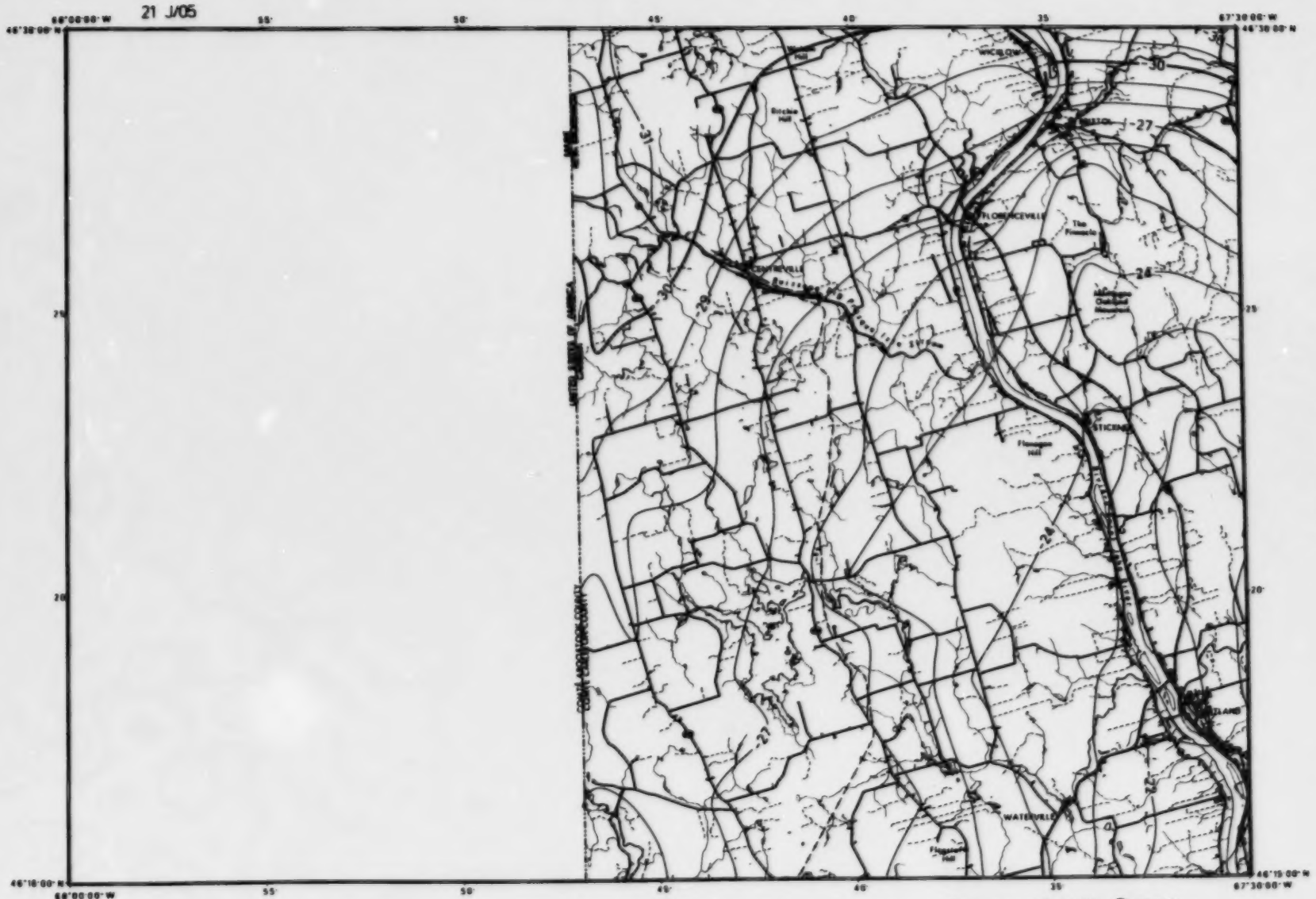

21 J/02
67°00'00" W
66°30'00" W
46°15'00" N
46°00'00" N
55
50
45
40
35
10
5
Miles
Metres
BURTTS CORNER
Freeair Gravity Survey


21 J/03
67°30'00" W
67°00'00" W
46°15'00" N
46°00'00" N
25
20
15
10
5
-20
-30
-40
-50
Miles
Metres
MILLVILLE
Bouguer Gravity Survey

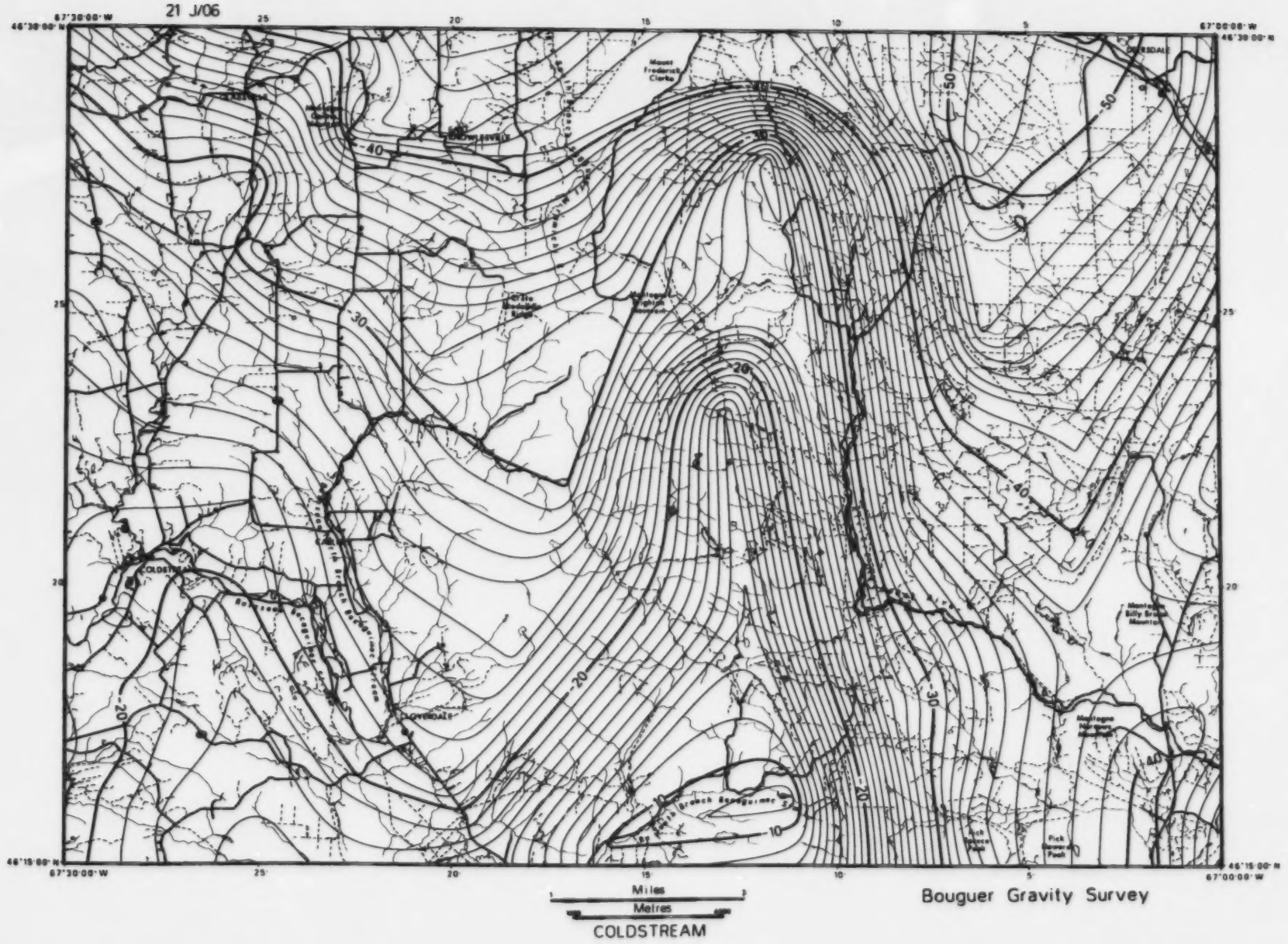

21 J/03
67°30'00" W
46°15'00" N
67°00'00" W
46°00'00" N
Miles
Metres
MILLVILLE
Freeair Gravity Survey

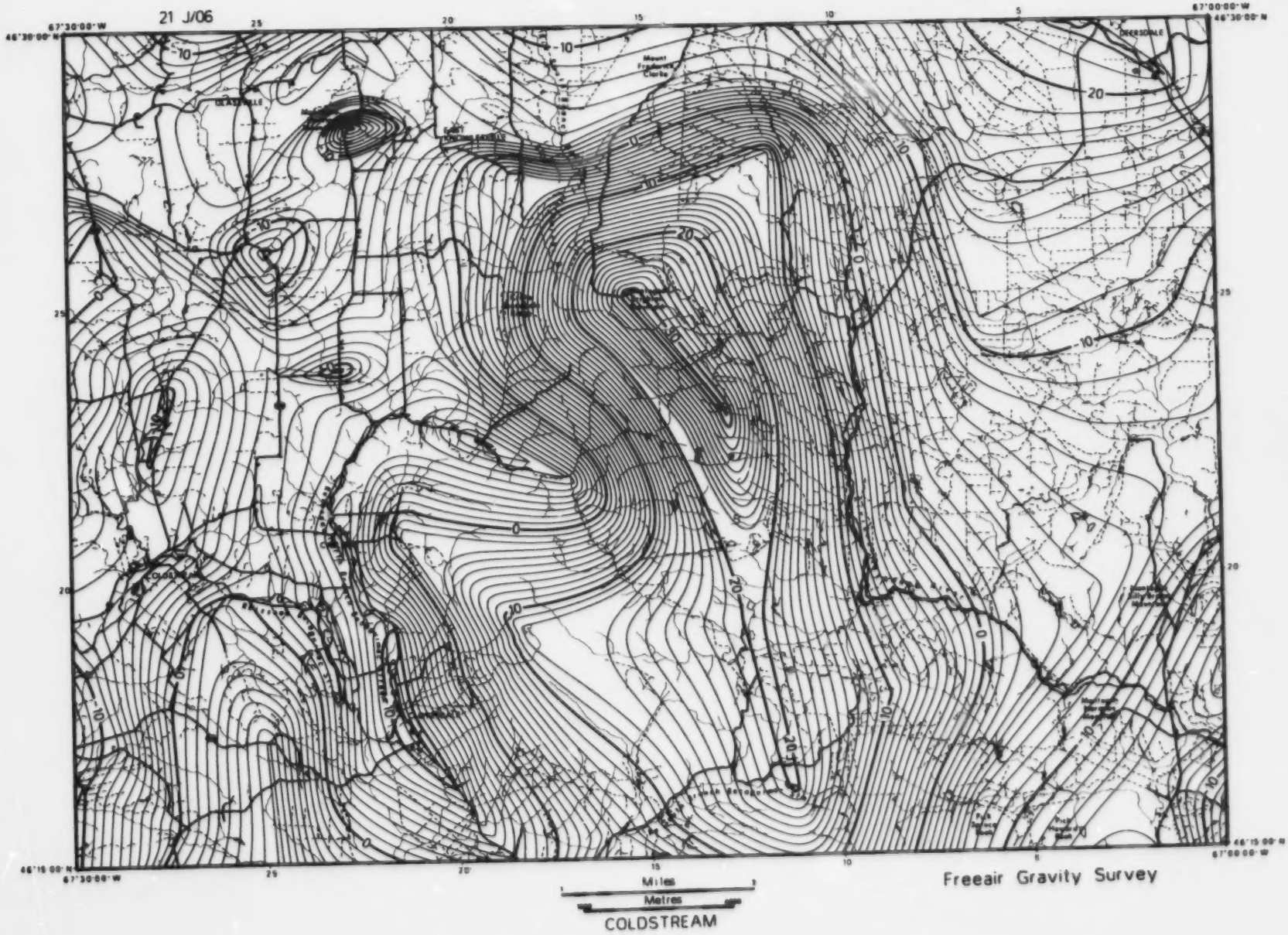

21 J/04
68°00'00"W
46°15'00"N
55'
50'
45'
40'
35'
67°30'00"W
10'
5'
46°00'00"N
-29
-26
-24
-23
-21
JACKSONVILLE
WOODSTOCK
DEBEC
HIGHAM
Miles
Metres
WOODSTOCK
Bouguer Gravity Survey

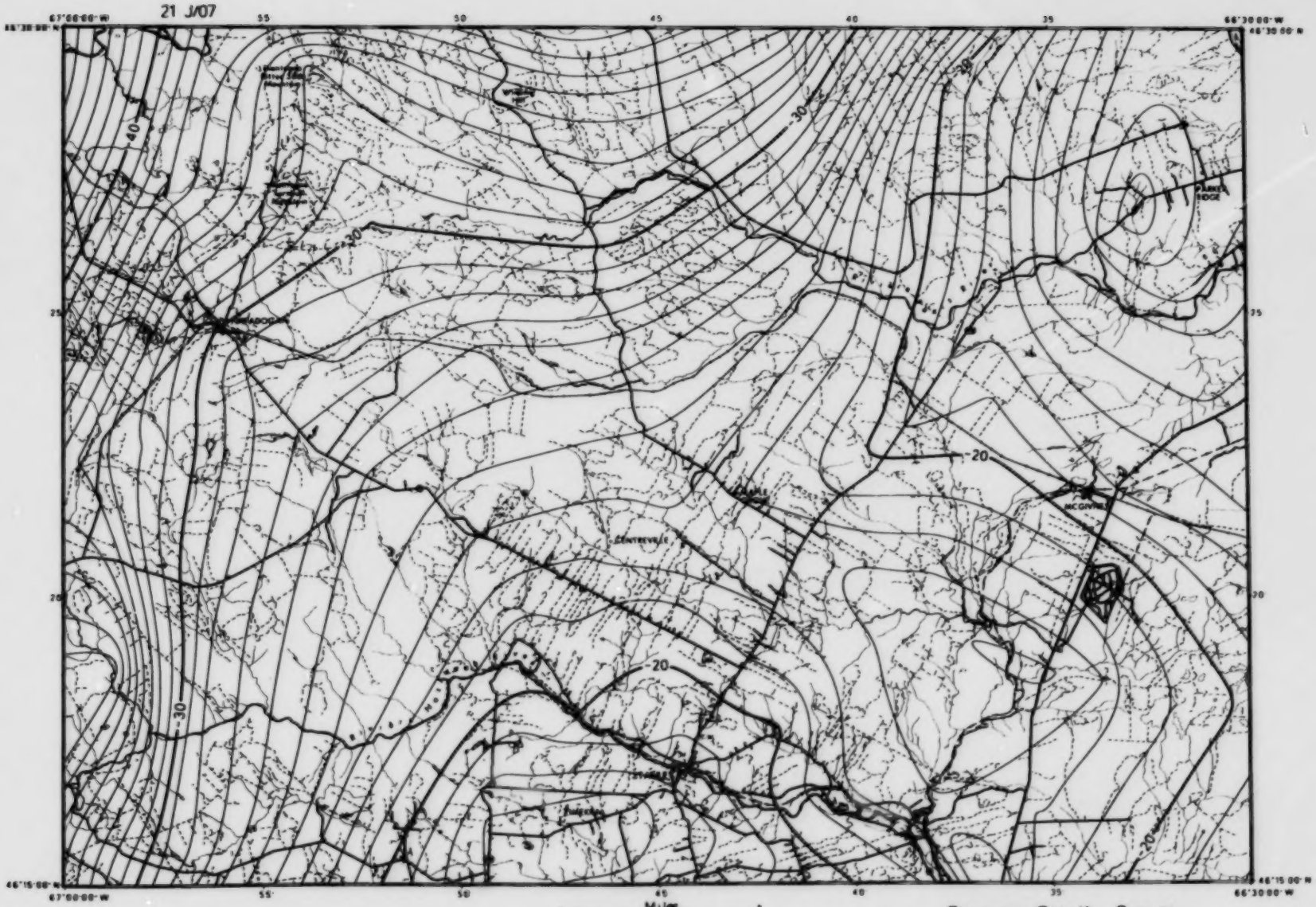

21 J/04
68°00'00" W
46°15'00" N
55'
50'
45'
40'
35'
67°30'00" W
10'
5'
44°00'00" N
46°00'00" N
WOODSTOCK
Miles
Metres
WOODSTOCK
Freeair Gravity Survey


21 J/05
68°00'00" W
46°30'00" N
55'
50'
45'
40'
35'
67°30'00" W
46°30'00" N
30
27
28
25
20
46°15'00" N
68°00'00" W
67°30'00" W
46°15'00" N
Miles
Metres
FLORENCEVILLE
Bouguer Gravity Survey

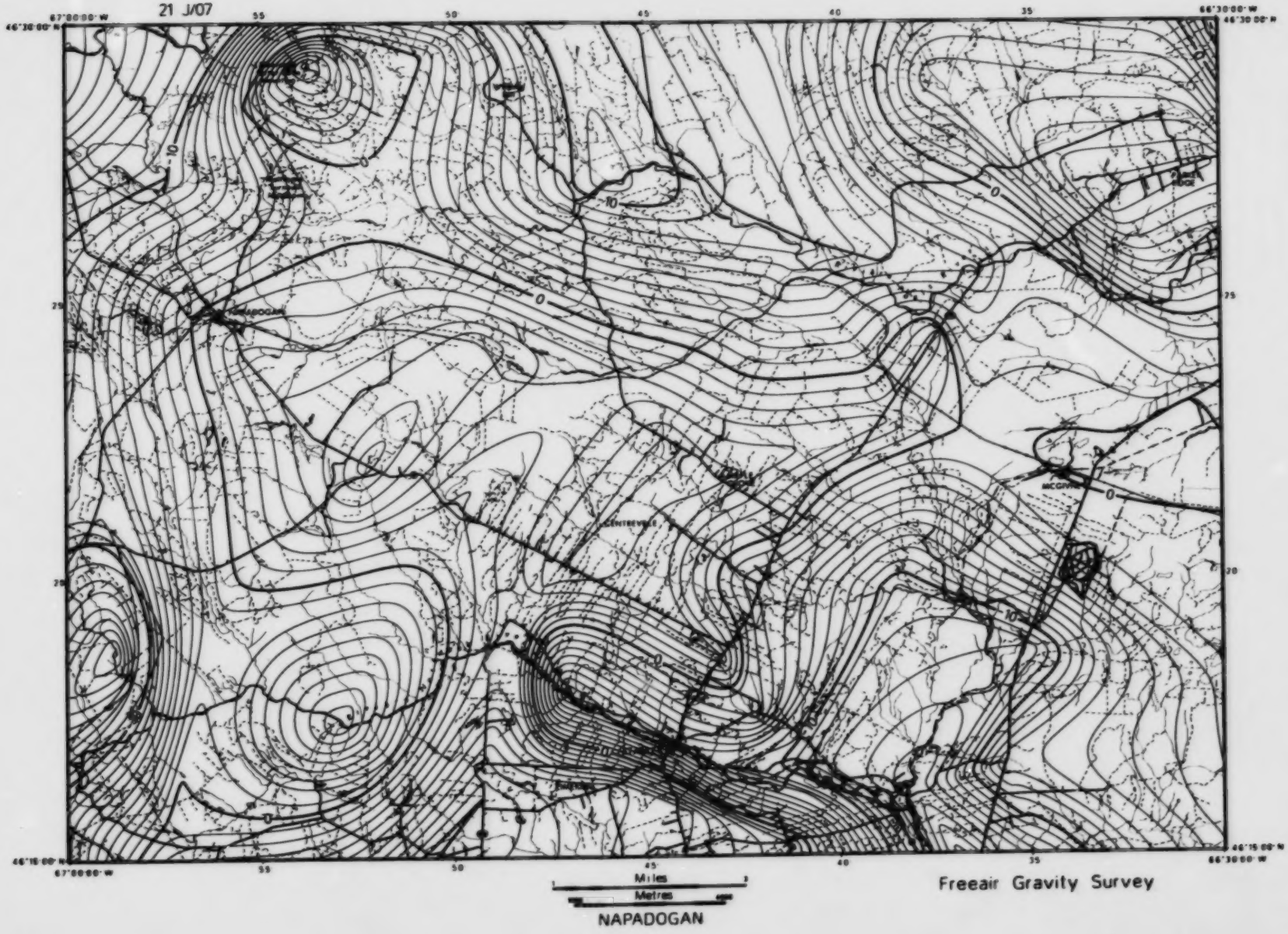

21 J/05
68°00'00" W
46°30'00" N
55'
50'
45'
40'
35'
67°30'00" W
25'
20'
46°15'00" N
Miles
Metres
FLORENCEVILLE
Freeair Gravity Survey

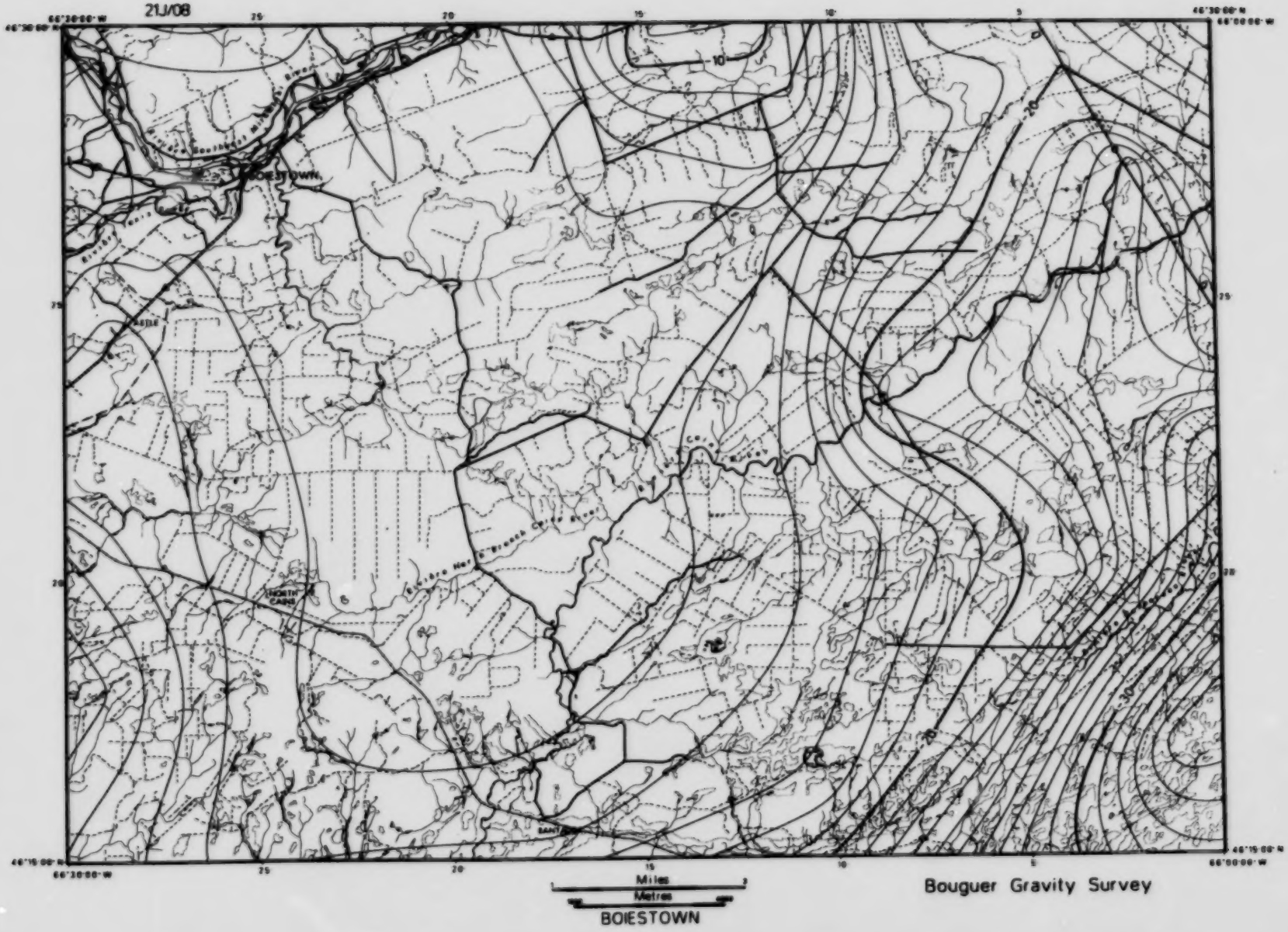

21 J/06
67°30'00"W
46°30'00"N
67°00'00"W
46°15'00"N
Mount Frederick Clarke
DRESDALE
COLDSTREAM
Overdale
Miles
Metres
COLDSTREAM
Bouguer Gravity Survey


21 J/06
67°30'00"W
46°30'00"N
67°00'00"W
46°15'00"N
Miles
Metres
COLDSTREAM
Freeair Gravity Survey

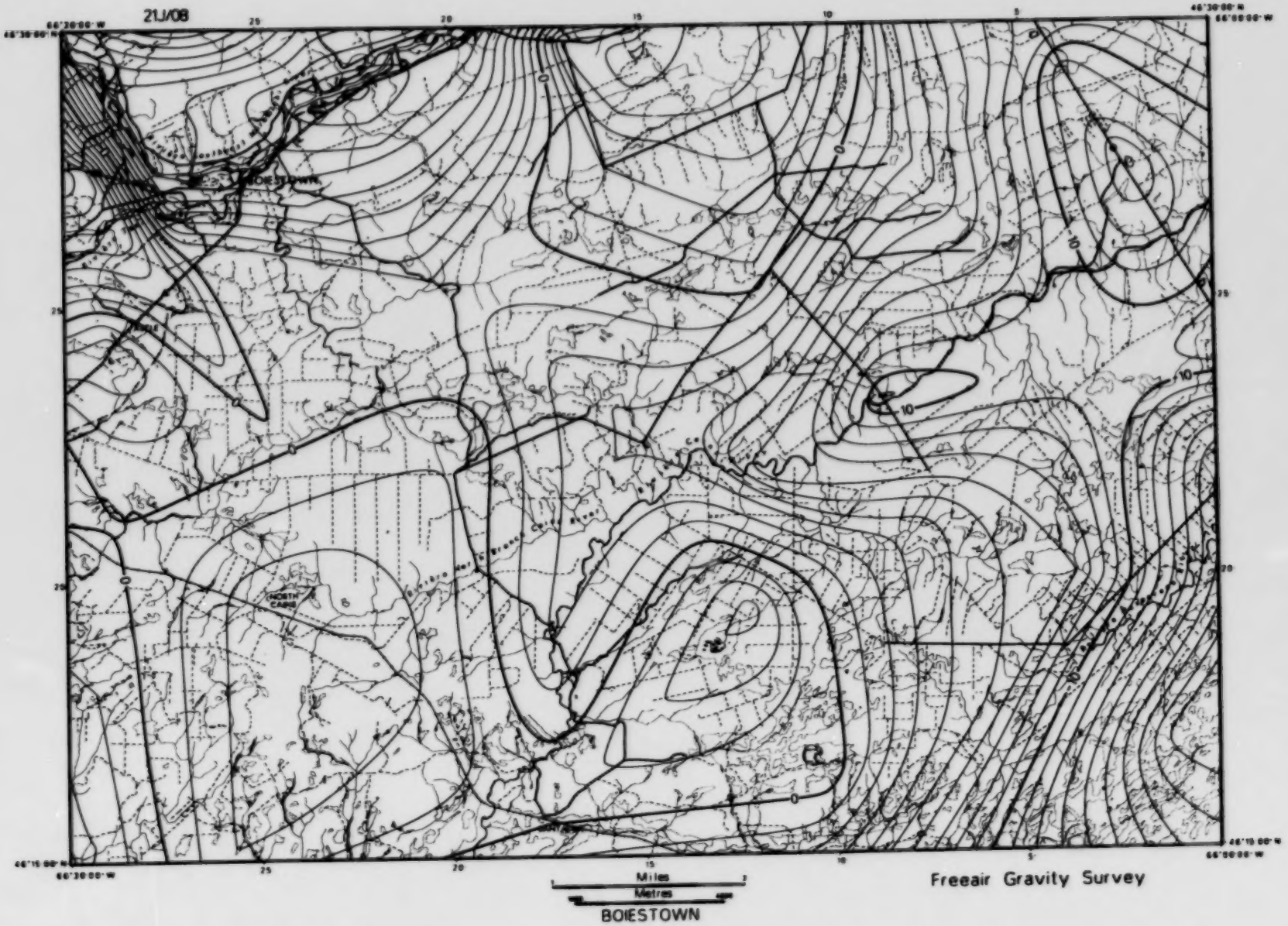


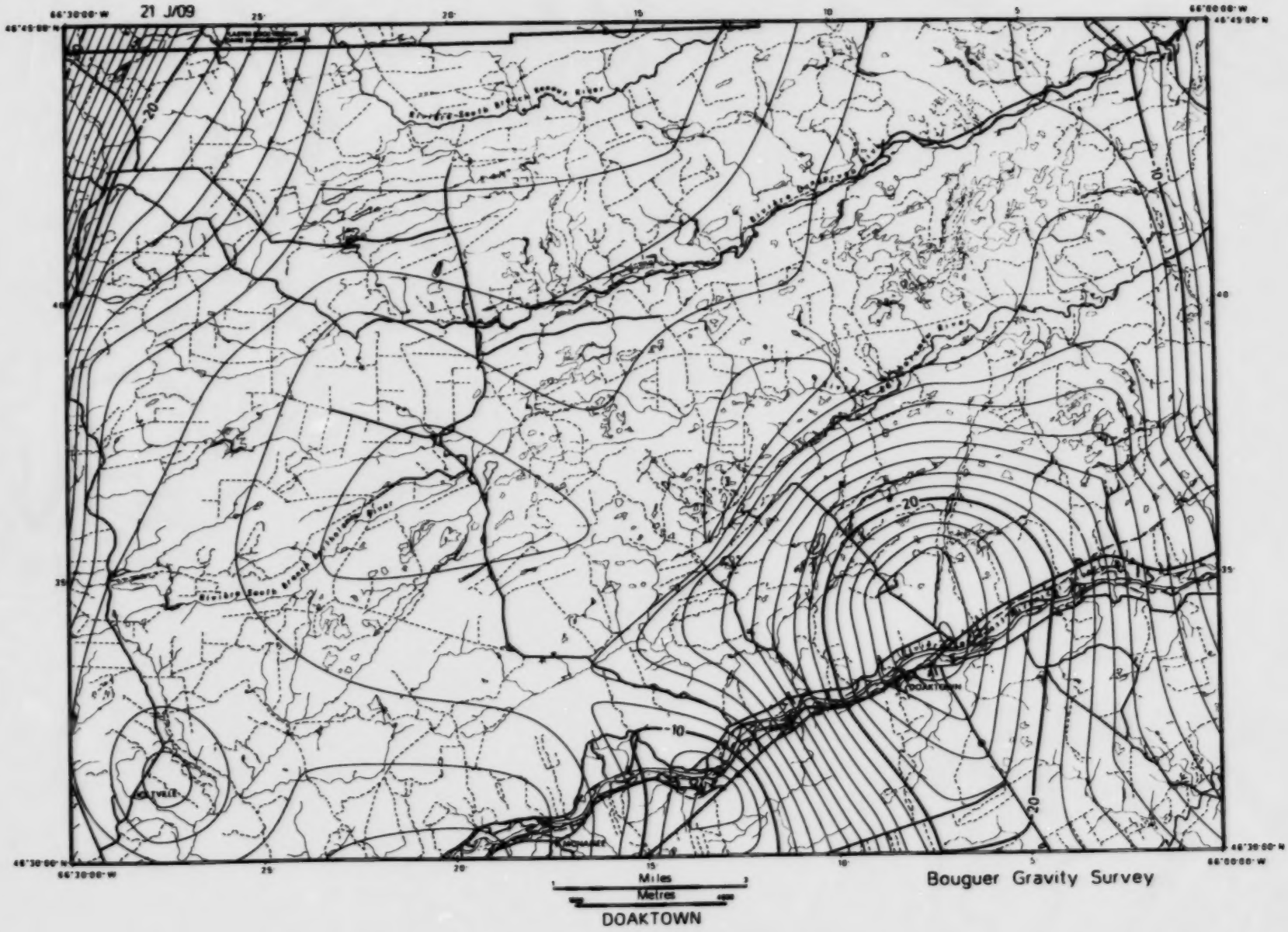
Bouguer Gravity Survey

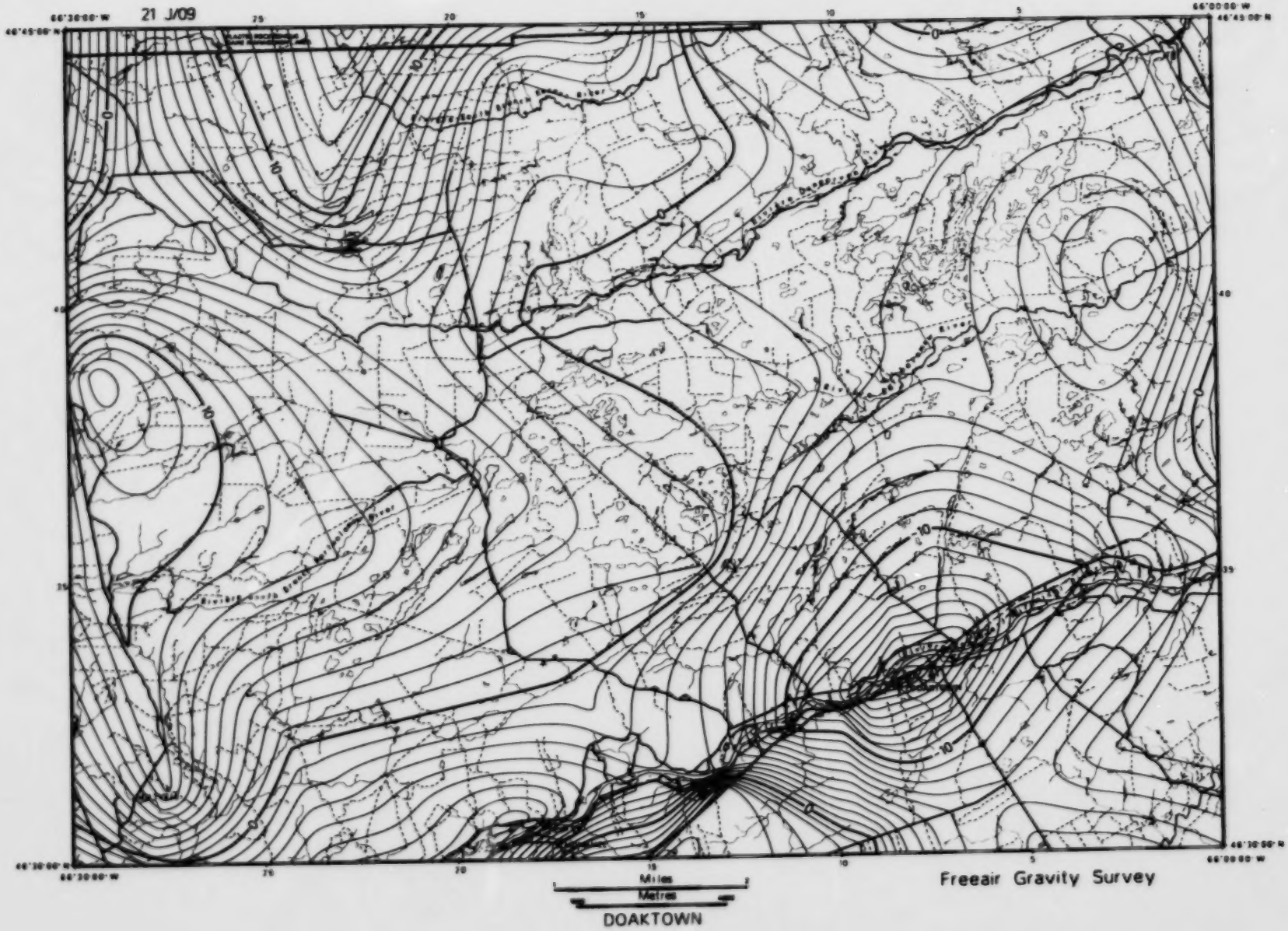

21 J/07
67°30'00" W
46°30'00" N
46°15'00" N
55
50
45
40
35
Miles
Metres
NAPADOGAN
Freeair Gravity Survey

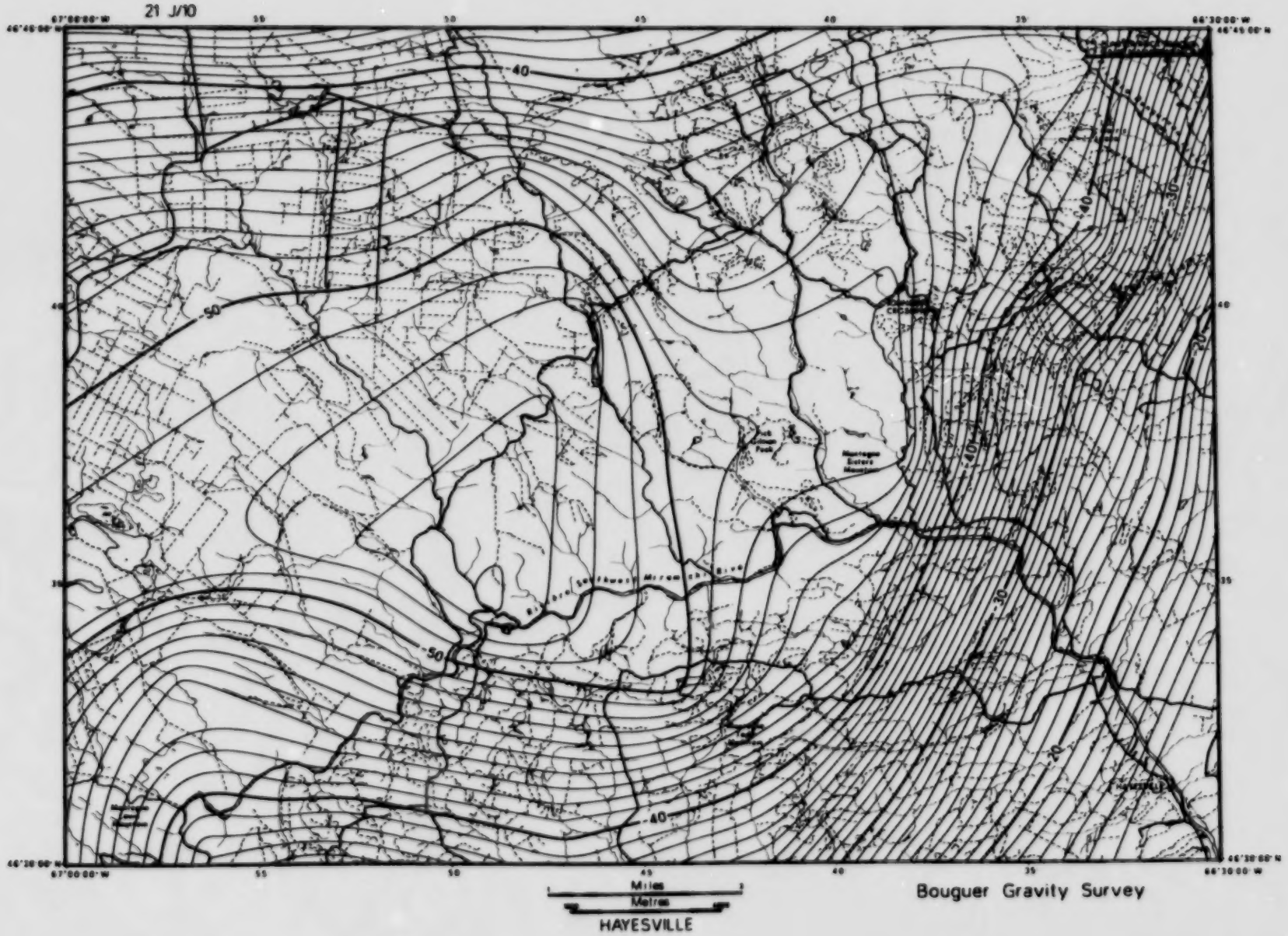


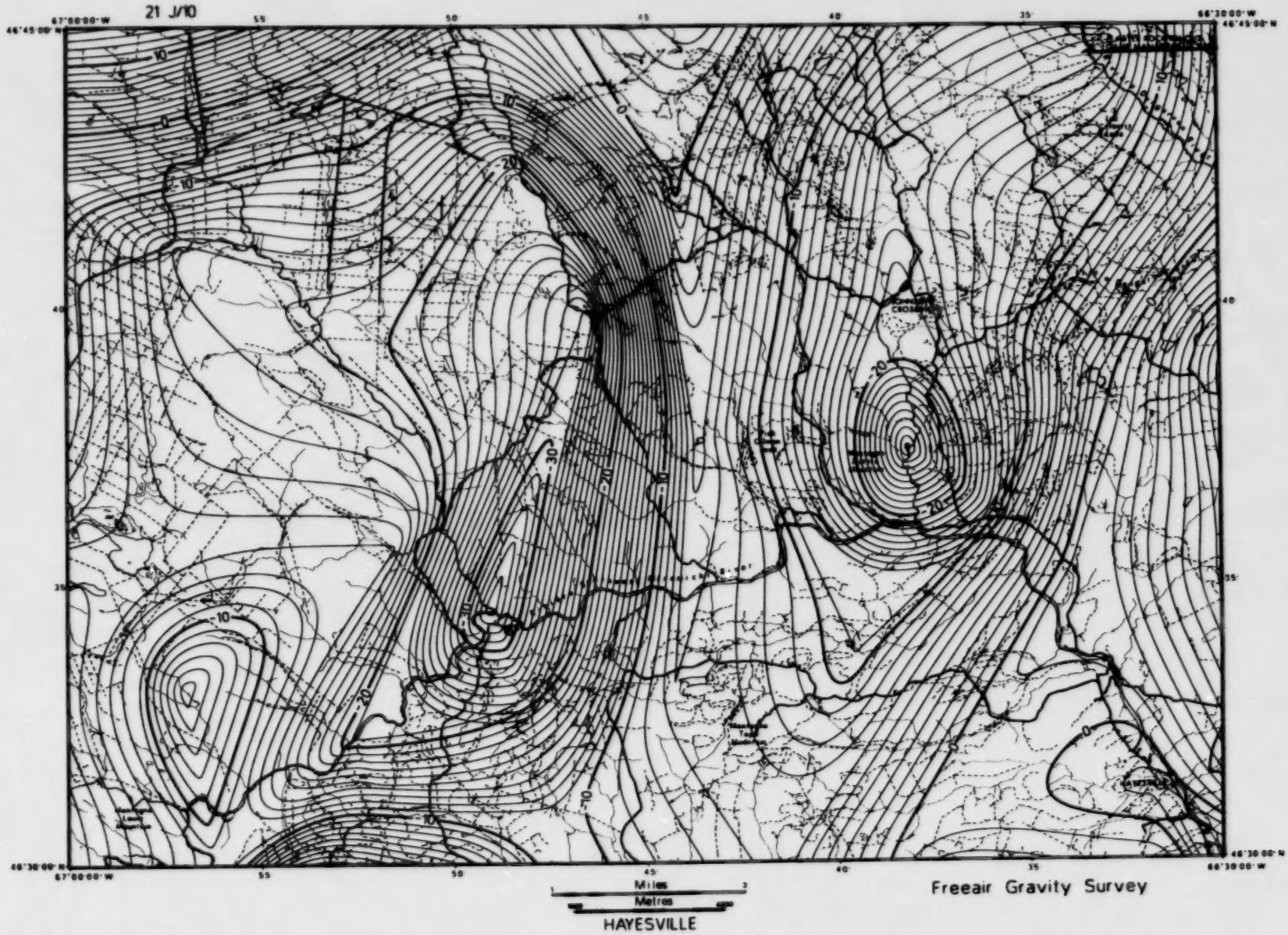
Bouguer Gravity Survey

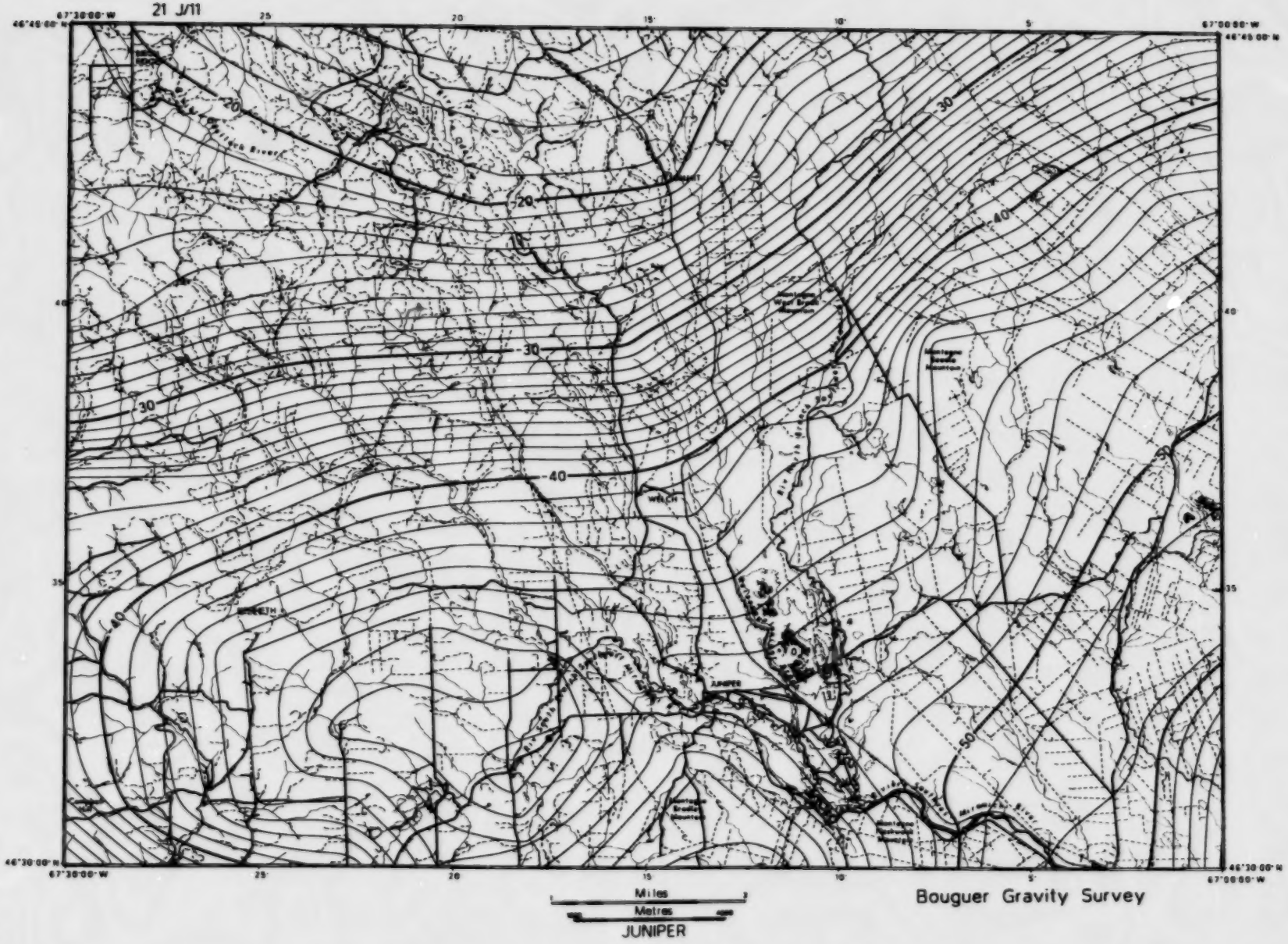

21J/08
66°30'00"W
66°20'00"W
46°30'00"N
46°15'00"N
25
20
15
10
5
0
10
BOIESTOWN
NORTH CAPE
Miles
Metres
BOIESTOWN
Freeair Gravity Survey


21 J/09
66°30'00"W
66°00'00"W
48°45'00"N
48°30'00"N
Miles
Metres
DOAKTOWN
Bouguer Gravity Survey

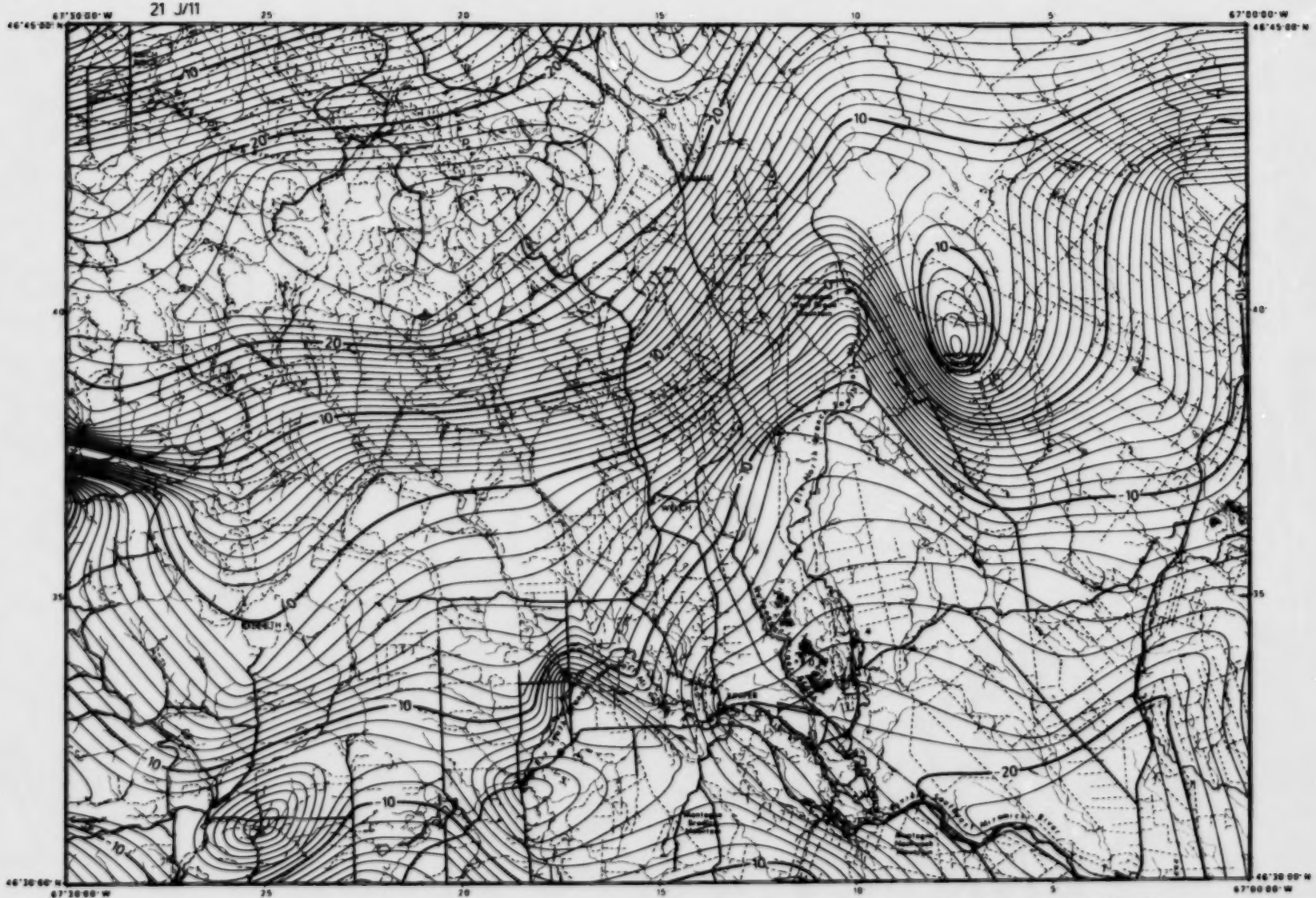

21 J/09
66°30'00" W
66°00'00" W
46°45'00" N
46°30'00" N
Miles
Metres
DOAKTOWN
Freeair Gravity Survey


21 J/10
67°00'00" W
66°30'00" W
46°45'00" N
46°30'00" N
-40
-50
-30
-20
Miles
Metres
HAYESVILLE
Bouguer Gravity Survey

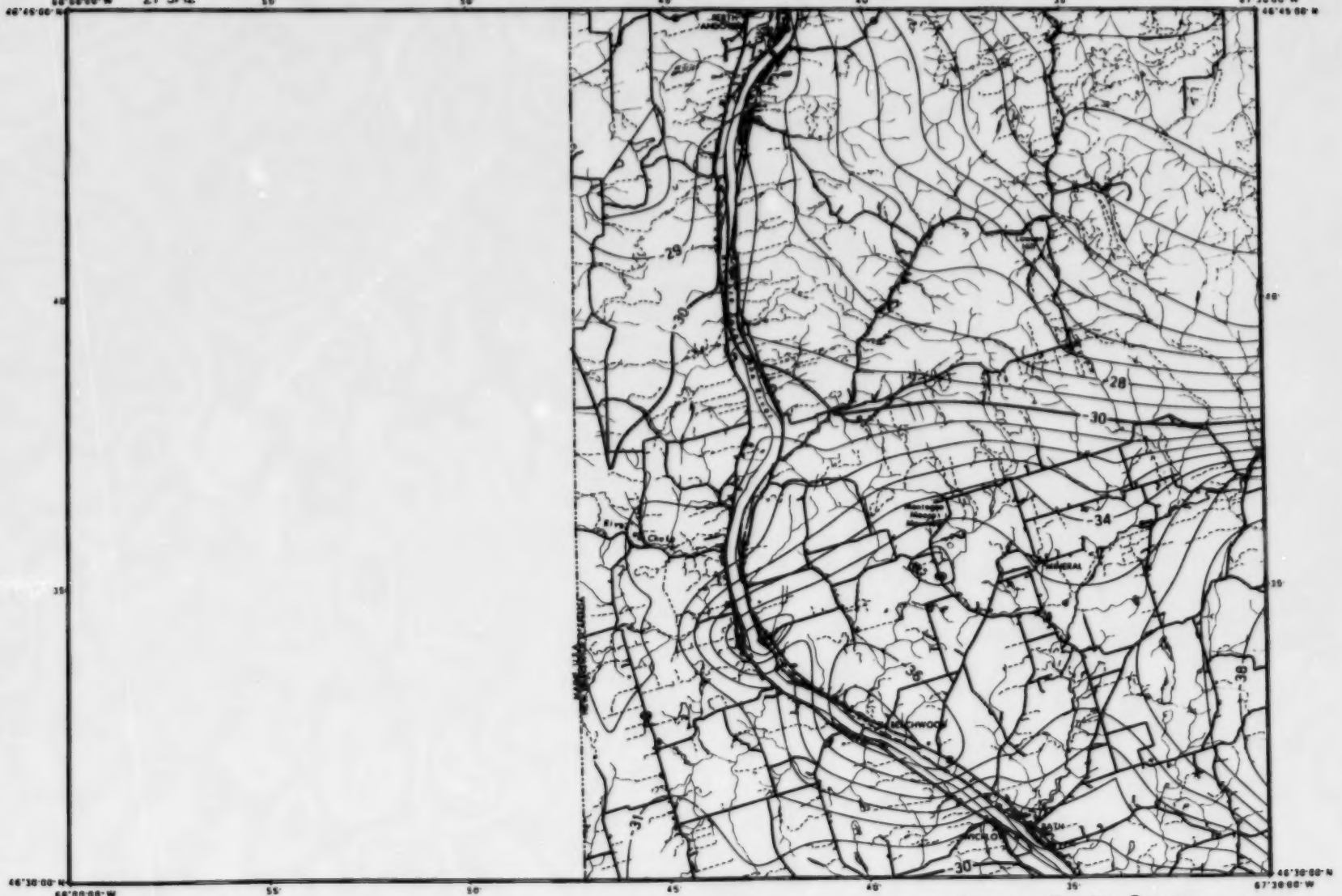

21 J/10
67°00'00" W
66°30'00" W
46°45'00" N
46°30'00" N
55
50
45
40
35
Miles
Metres
HAYESVILLE
Freeair Gravity Survey



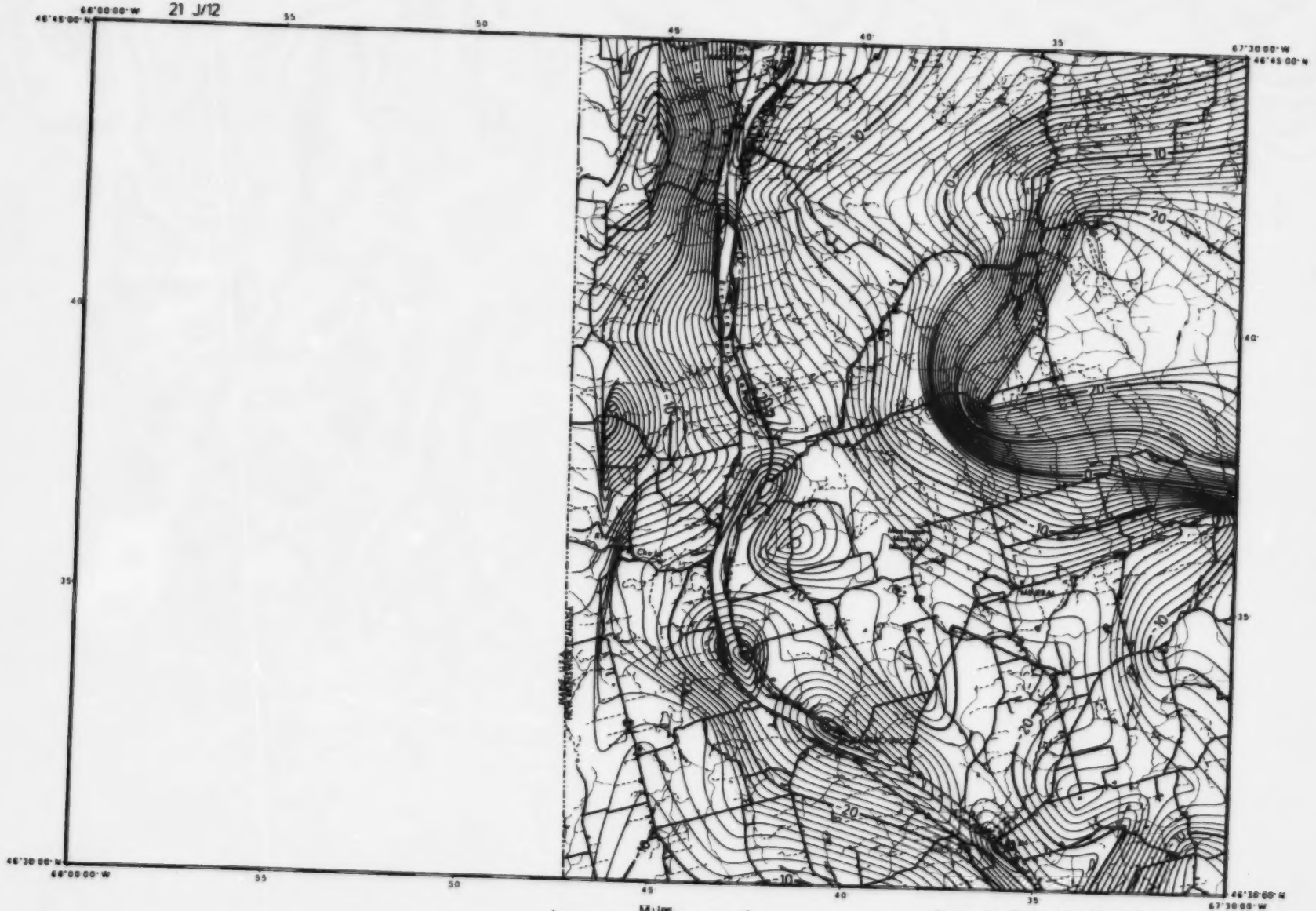
Bouguer Gravity Survey

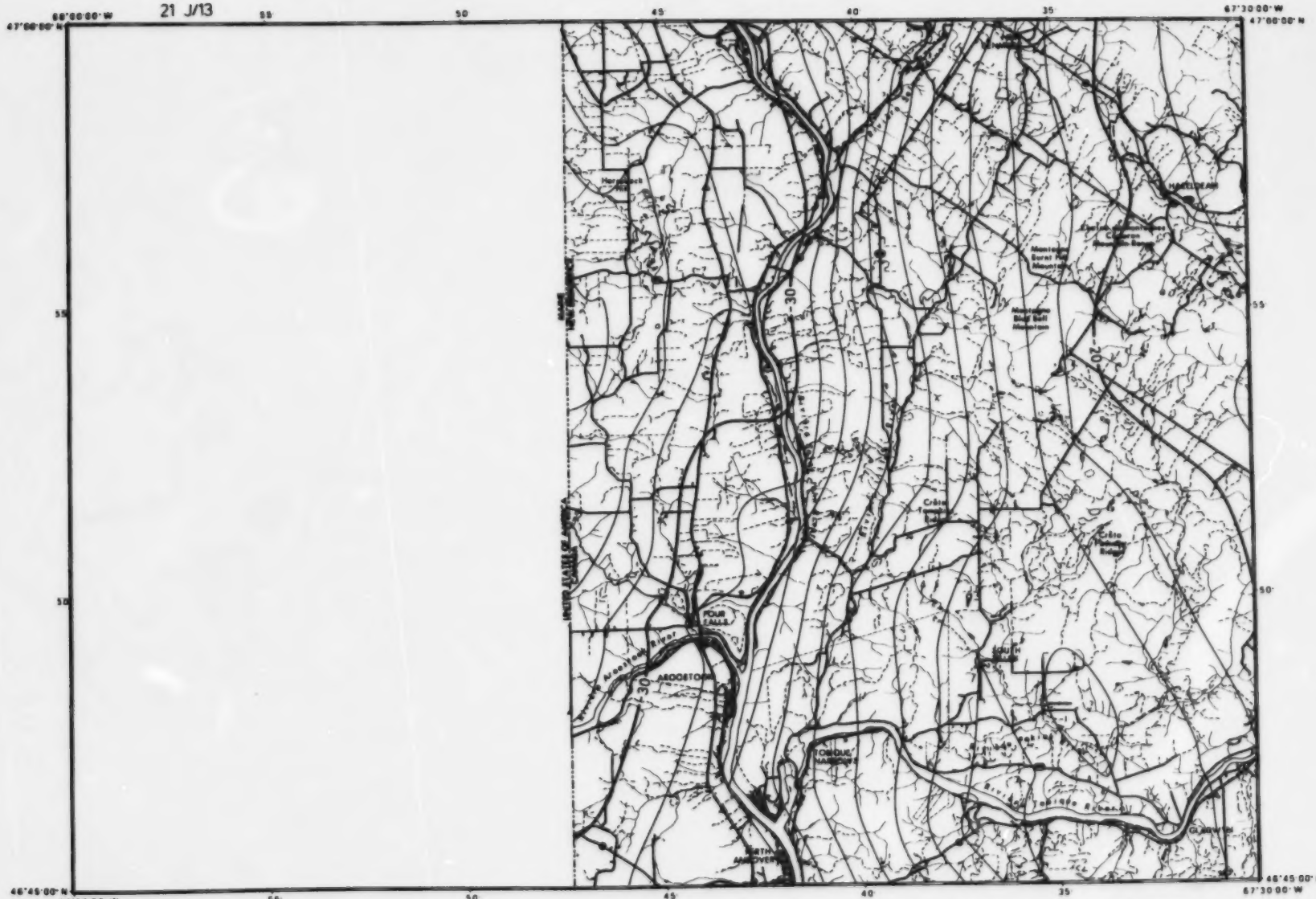


Freeair Gravity Survey

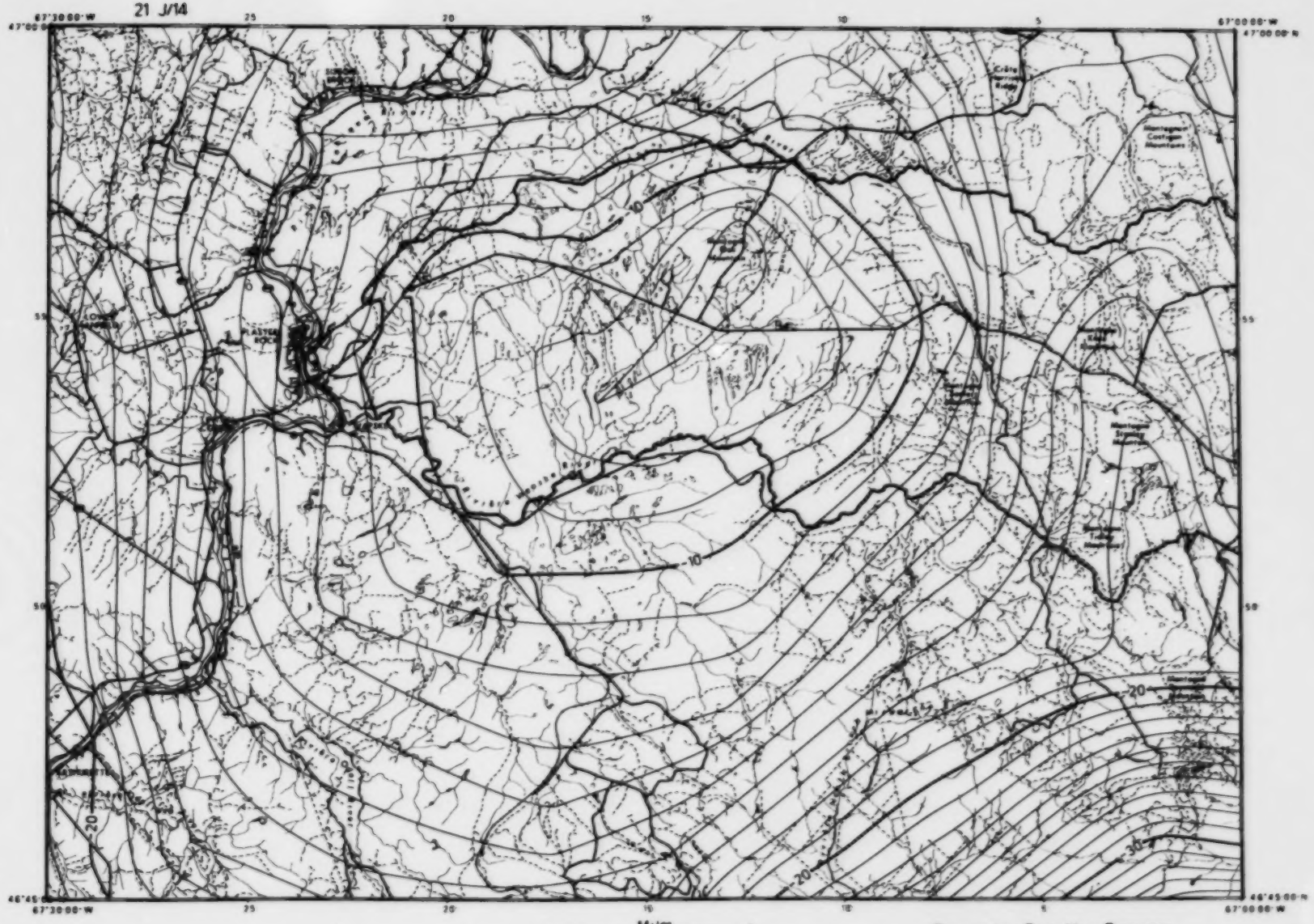


Bouguer Gravity Survey

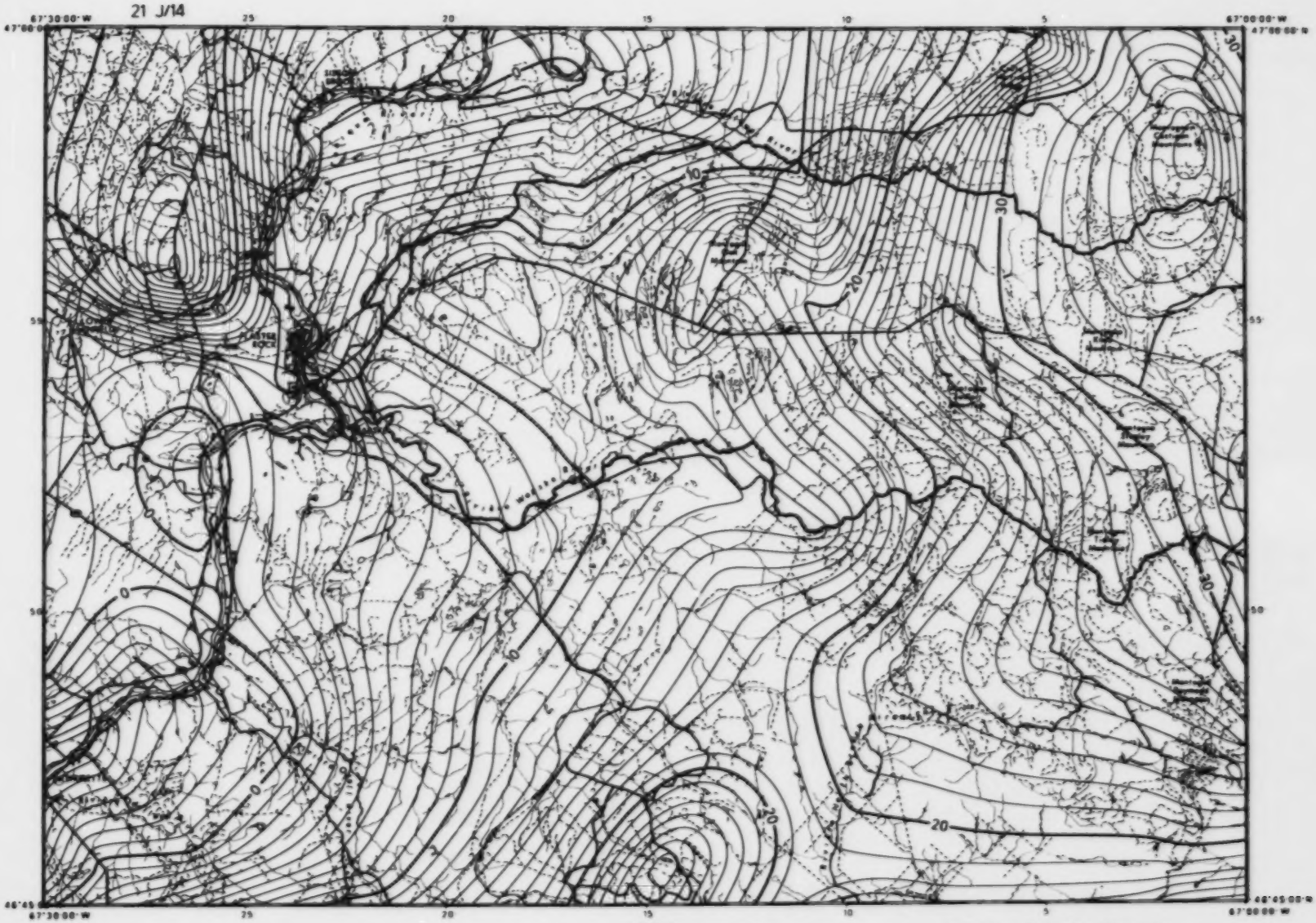

21 J/12
68°00'00"W
46°45'00"N
55
50
45
40
35
67°30'00"W
40
35
46°30'00"N
Miles
Metres
PERTH-ANDOVER
Freeair Gravity Survey


21 J/13
68°00'00"W
47°00'00"N
55
50
45
40
35
67°30'00"W
46°45'00"N
30
20
AROOSTOOK
Miles
Metres
Bouguer Gravity Survey

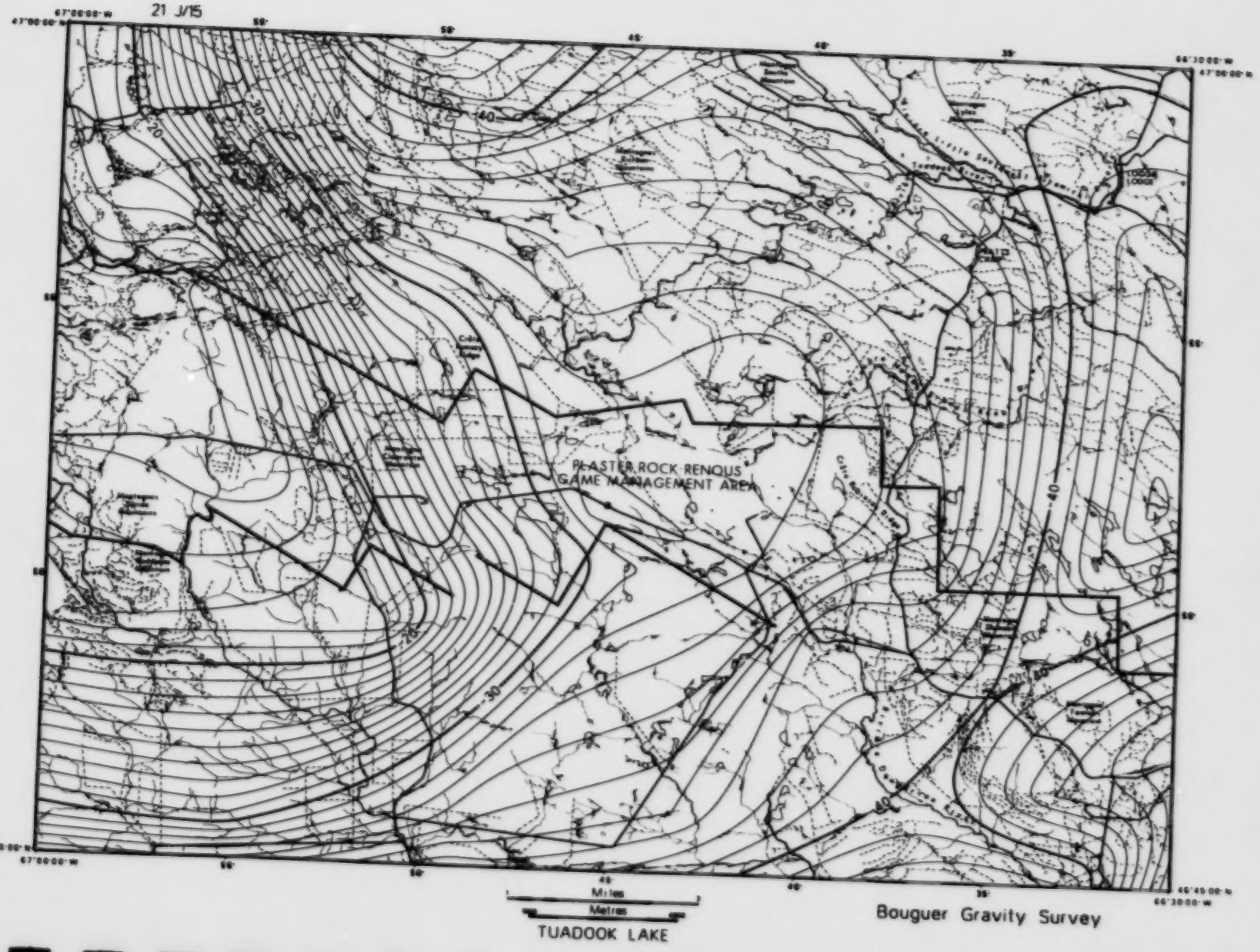

21 J/13
68°00'00"W
47°00'00"N
55
50
45
40
35
67°30'00"W
46°45'00"N
Miles
Metres
AROOSTOOK
Freeair Gravity Survey



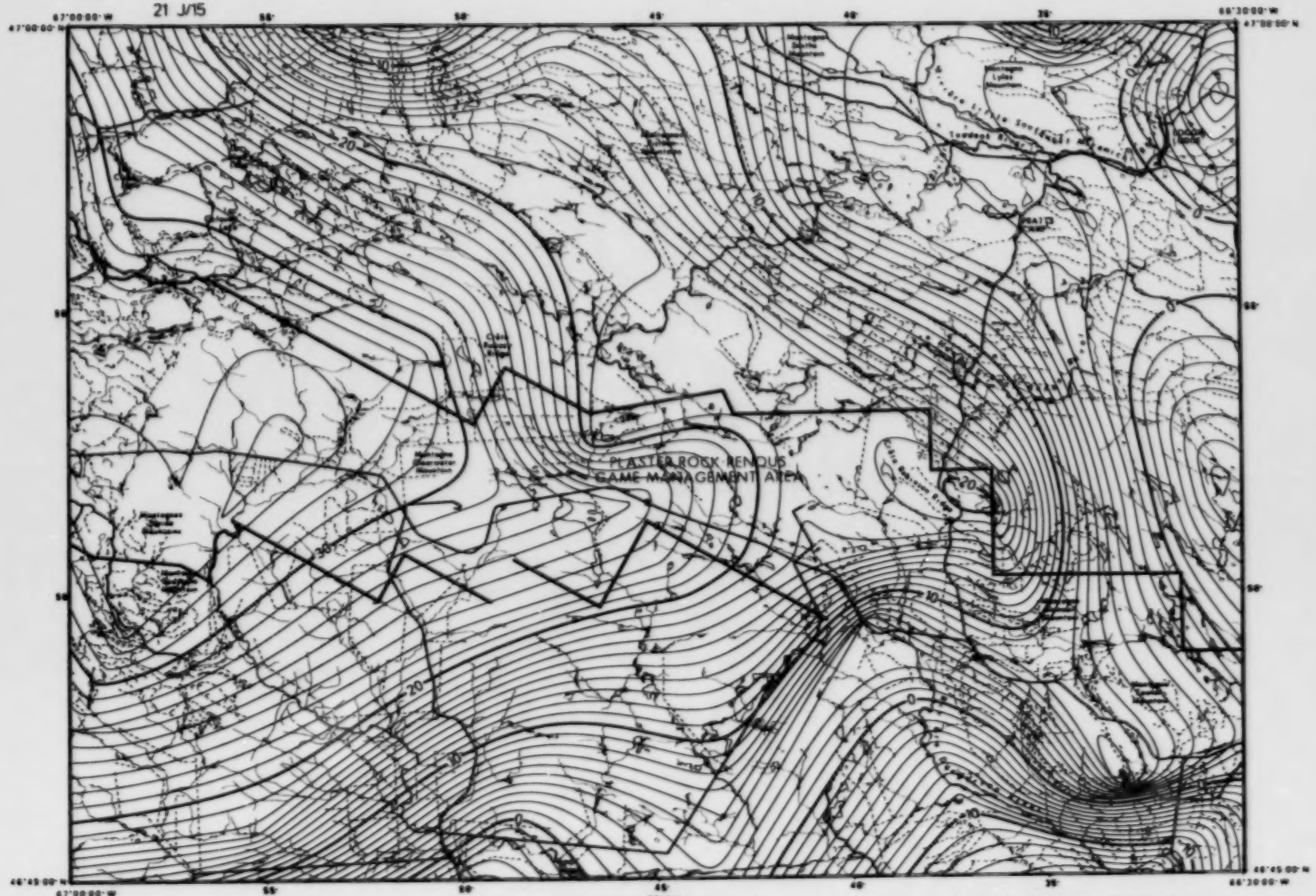
Bouguer Gravity Survey

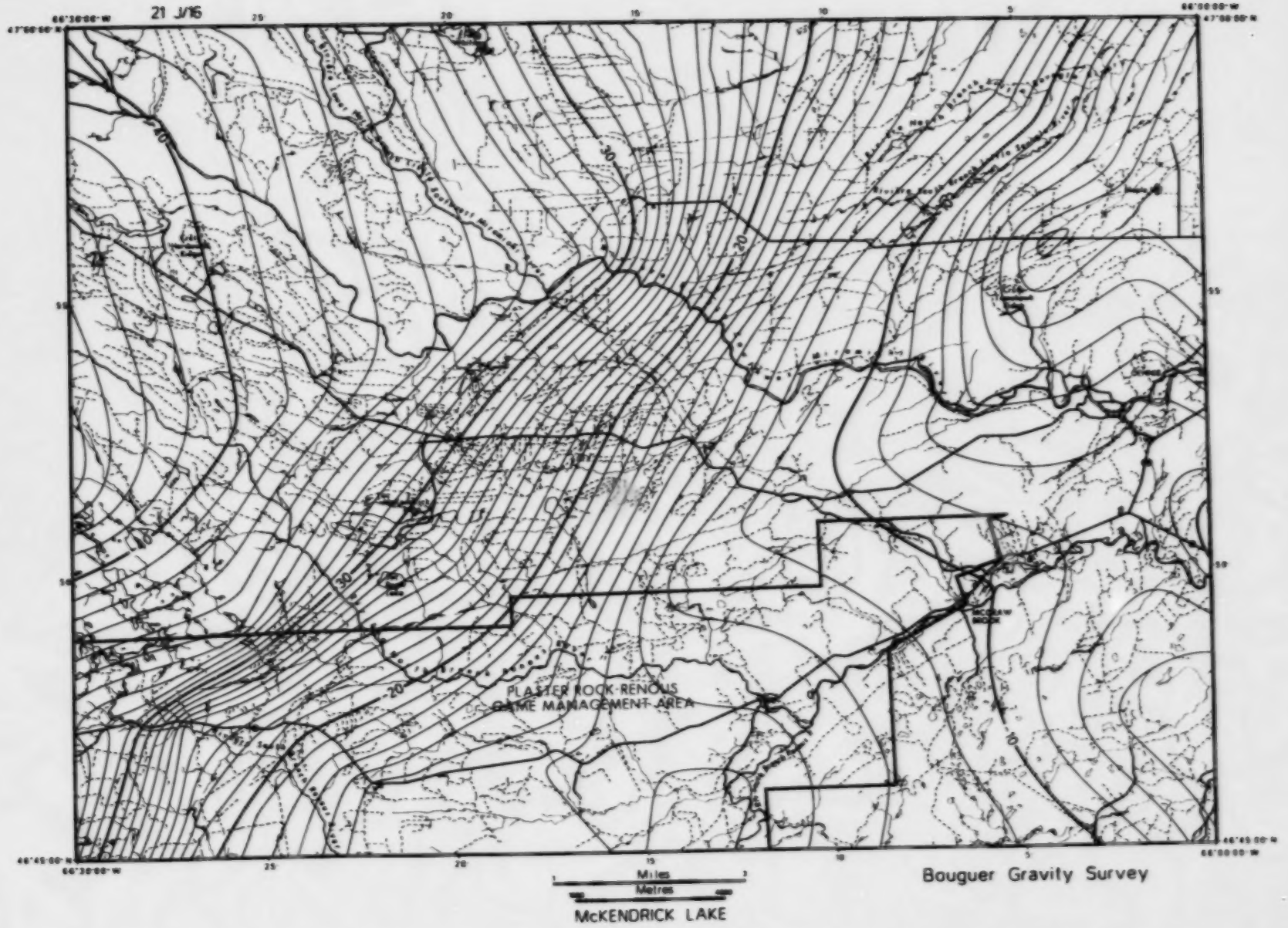


Freeair Gravity Survey

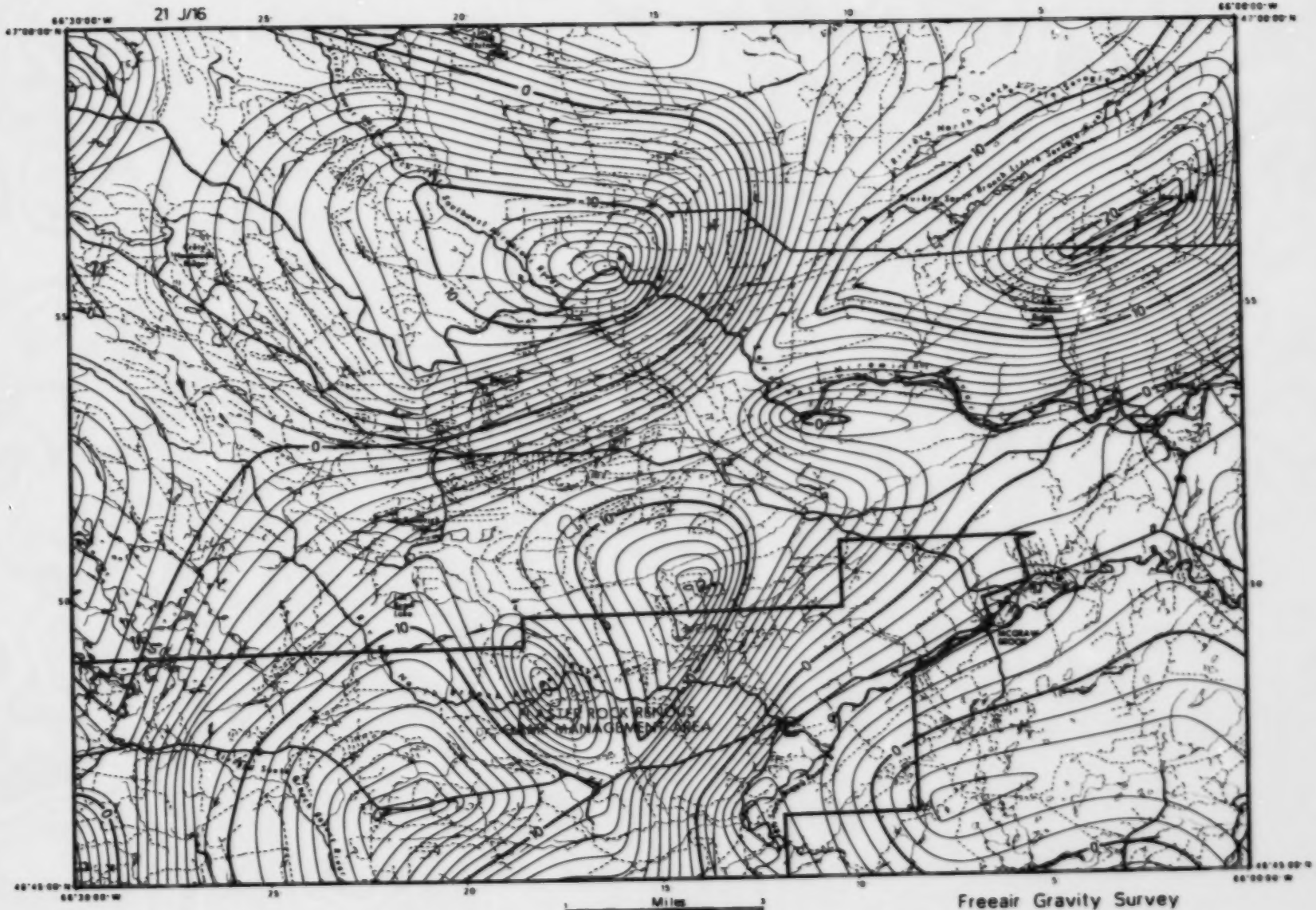


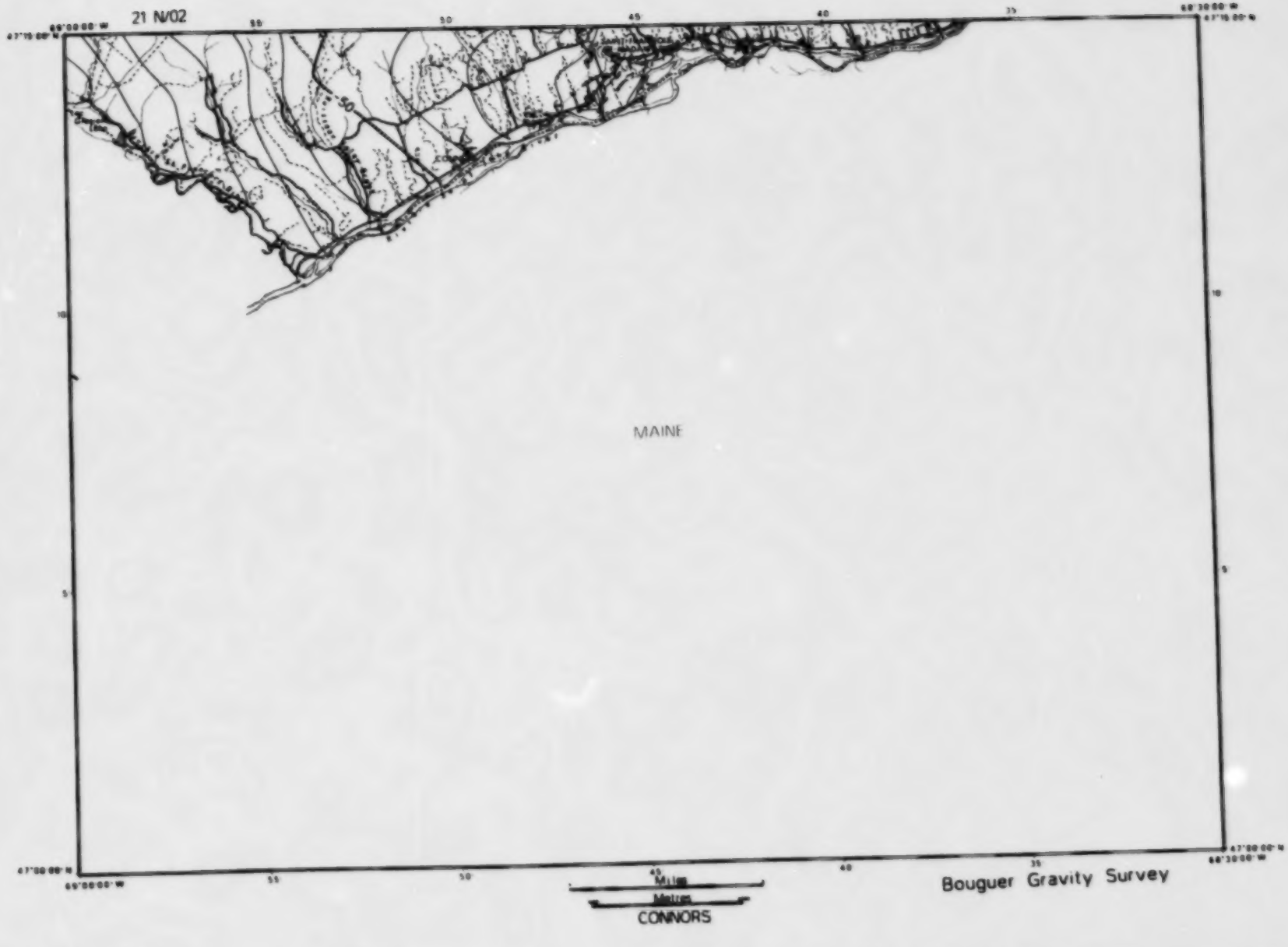
Bouguer Gravity Survey


21 J/15
67°00'00"W
47°00'00"N
55'
50'
45'
40'
35'
66°30'00"W
PLASTER ROCK RENOUS
GAME MANAGEMENT AREA
46°45'00"N
Miles
Metres
Freeair Gravity Survey
TUADOOK LAKE

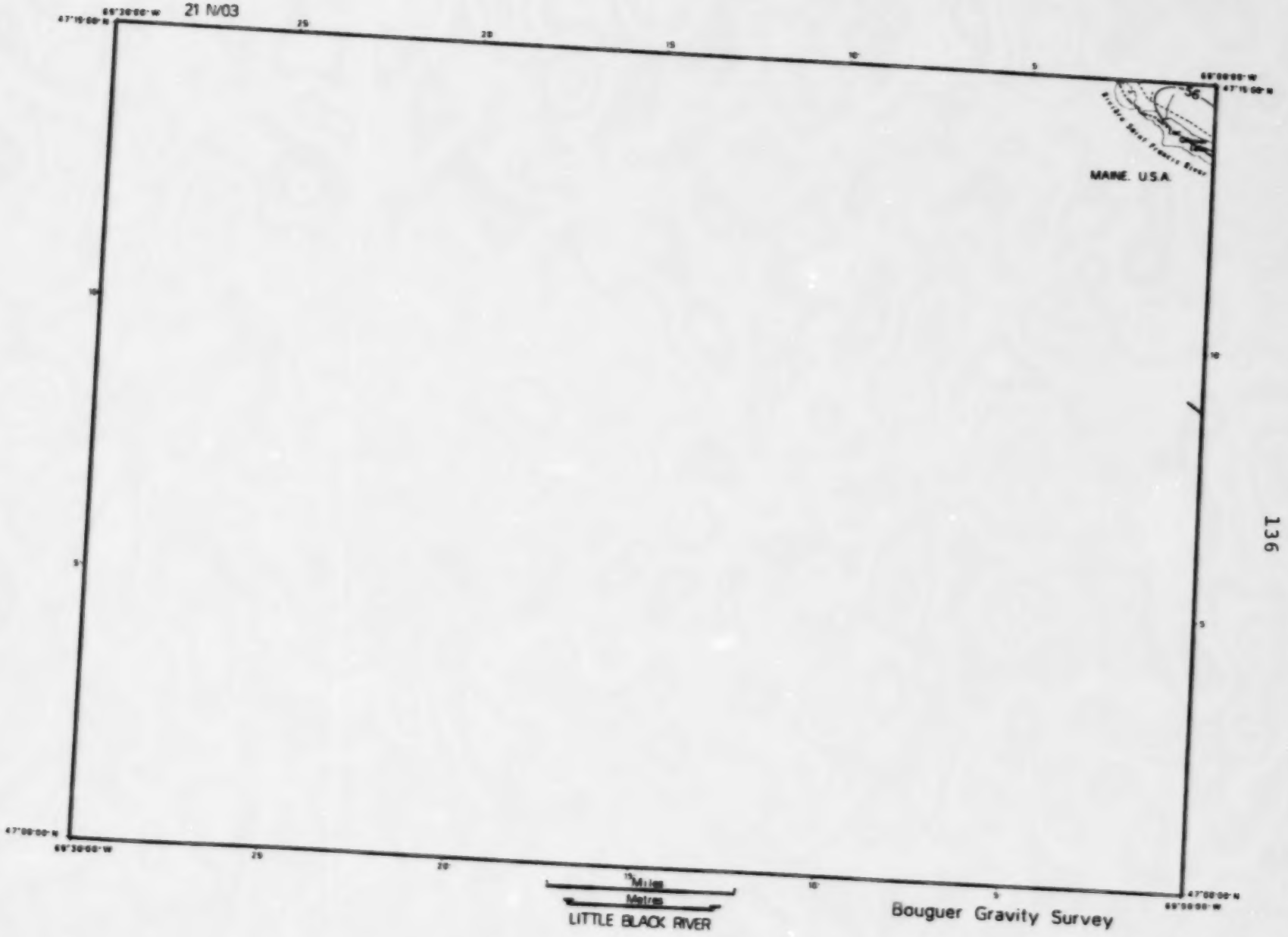


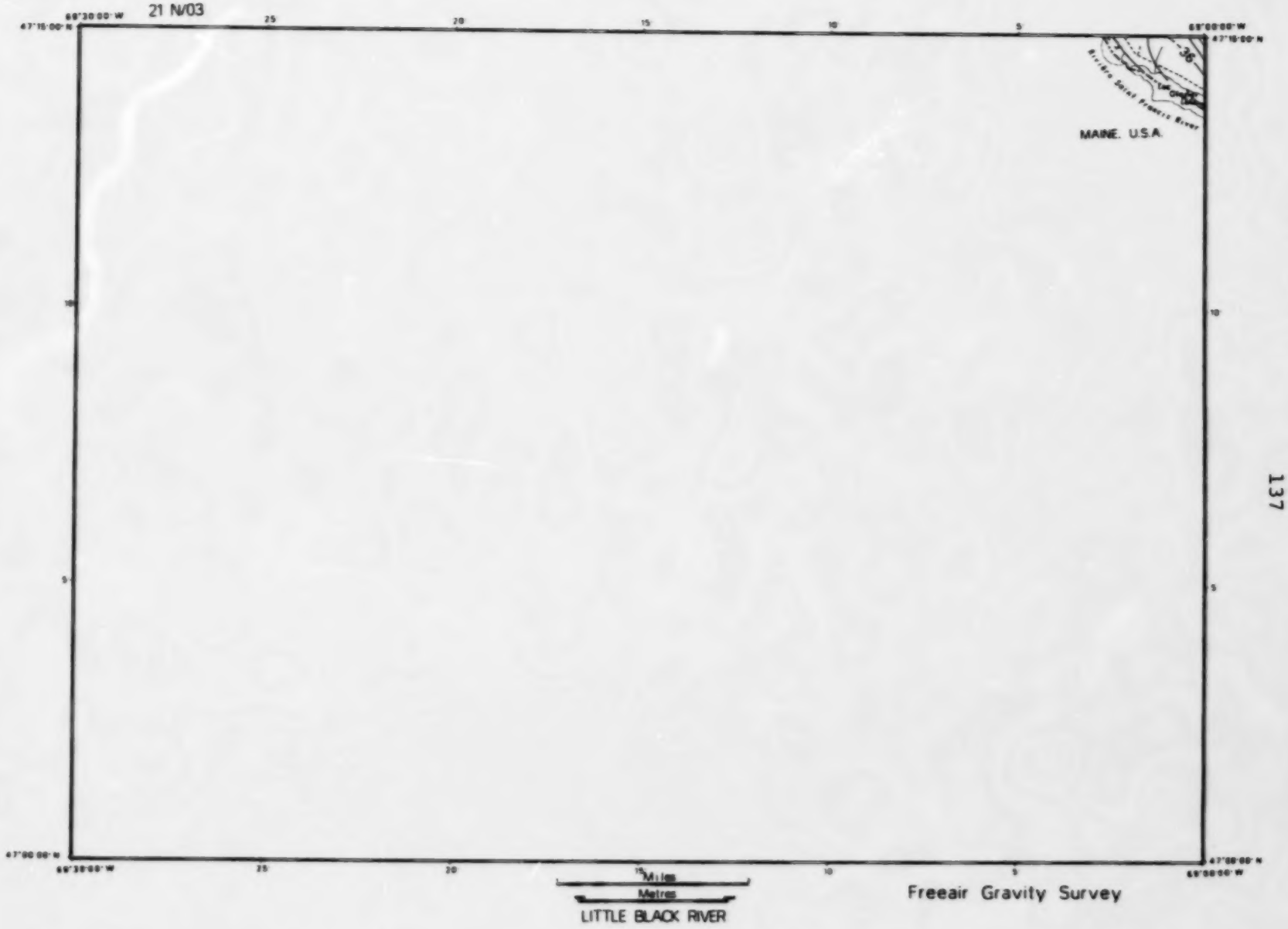
Bouguer Gravity Survey


21 J/16
66°30'00"W
66°00'00"W
47°00'00"N
48°45'00"N
25
20
15
10
5
55
50
0
10
Southwest Arm
Broken Bay
Broken Bay Provincial Wildlife Management Area
Lake
Brook
McGRATH BROOK
Miles
Metres
McKENDRICK LAKE
Freeair Gravity Survey

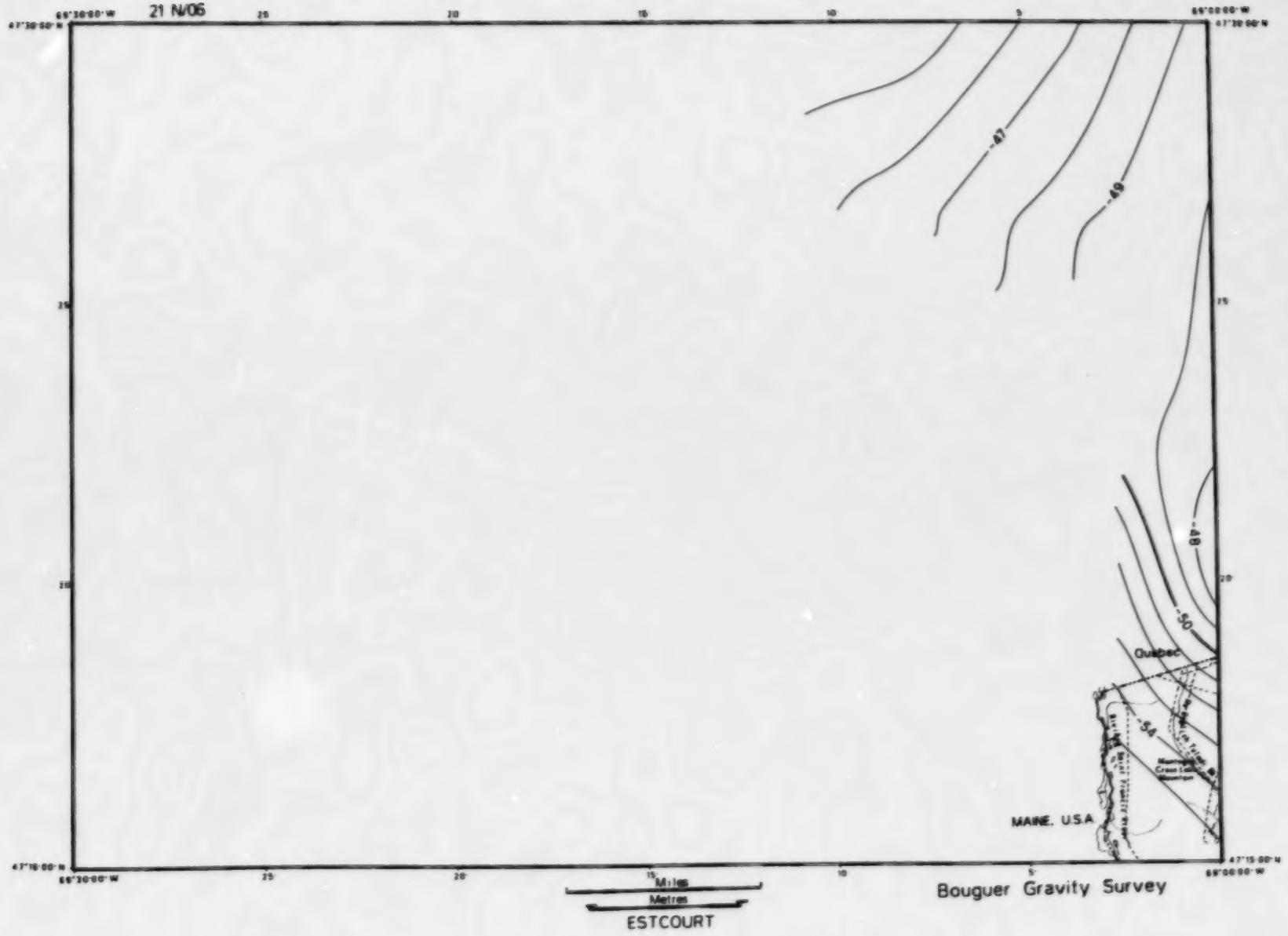

21 N/02
MAINE
Miles
Metres
CONNORS
Bouguer Gravity Survey

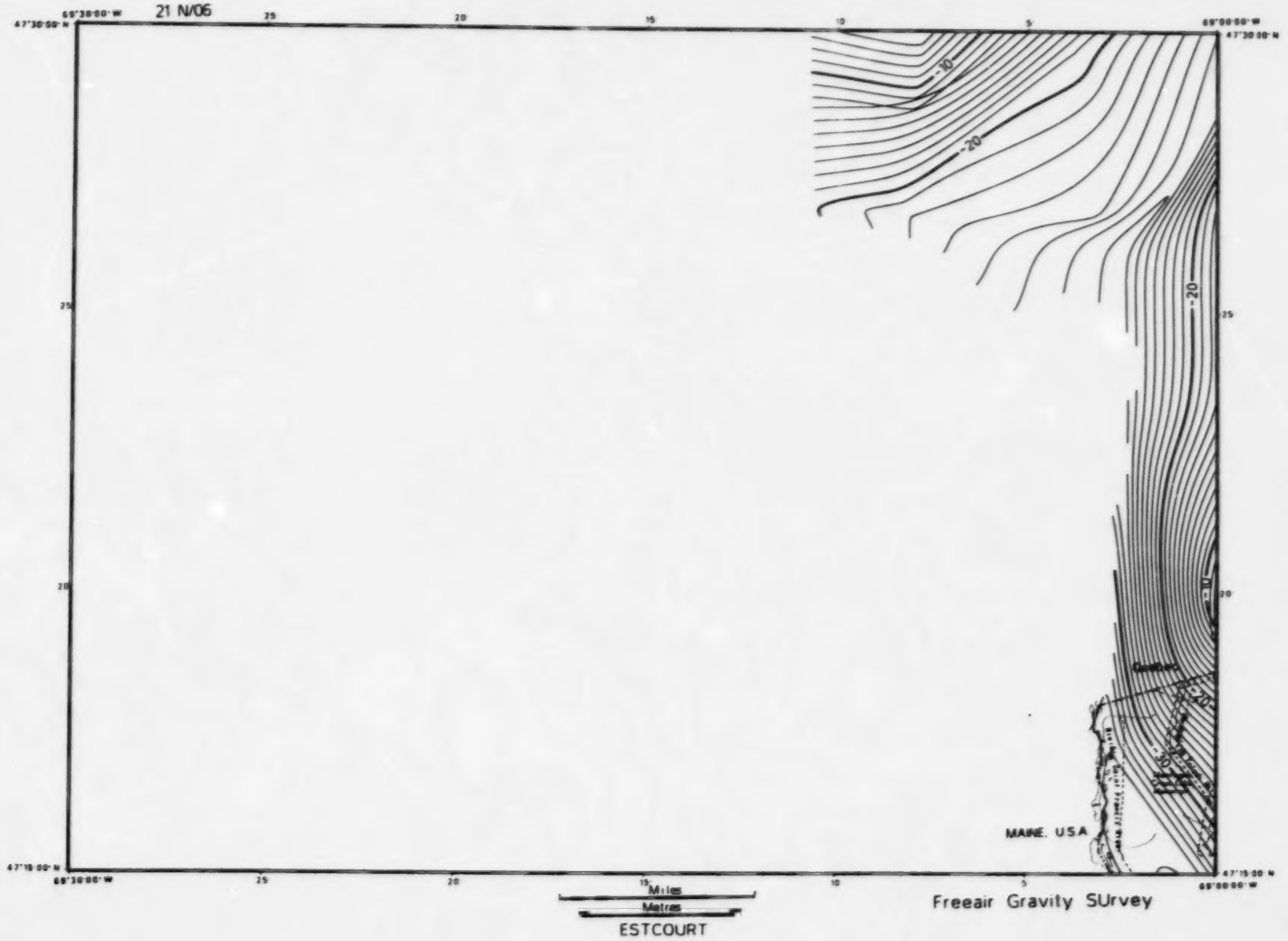

21 N/02
69°00'00" W
68°30'00" W
47°15'00" N
47°00'00" N
55
50
45
40
35
10
5
-20
-30
MAINE
Miles
Metres
CONNORS
Freeair Gravity Survey

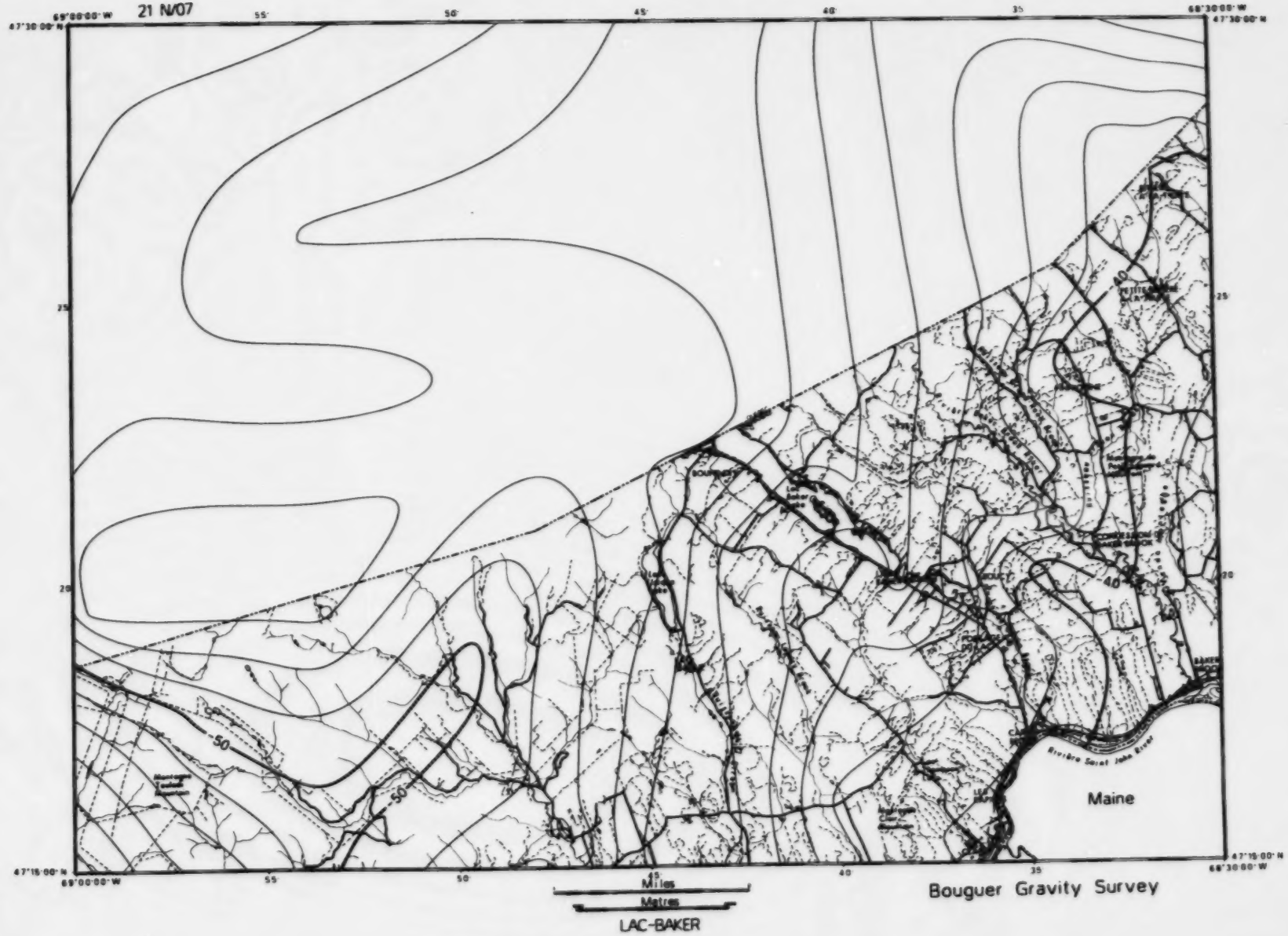

21 N/03
69°30'00"W
47°15'00"N
25
20
15
10
5
69°00'00"W
47°15'00"N
56
MAINE, U.S.A.
10
5
47°00'00"N
69°30'00"W
25
20
15
10
5
47°00'00"N
69°00'00"W
15 Miles
Metres
LITTLE BLACK RIVER
Bouguer Gravity Survey

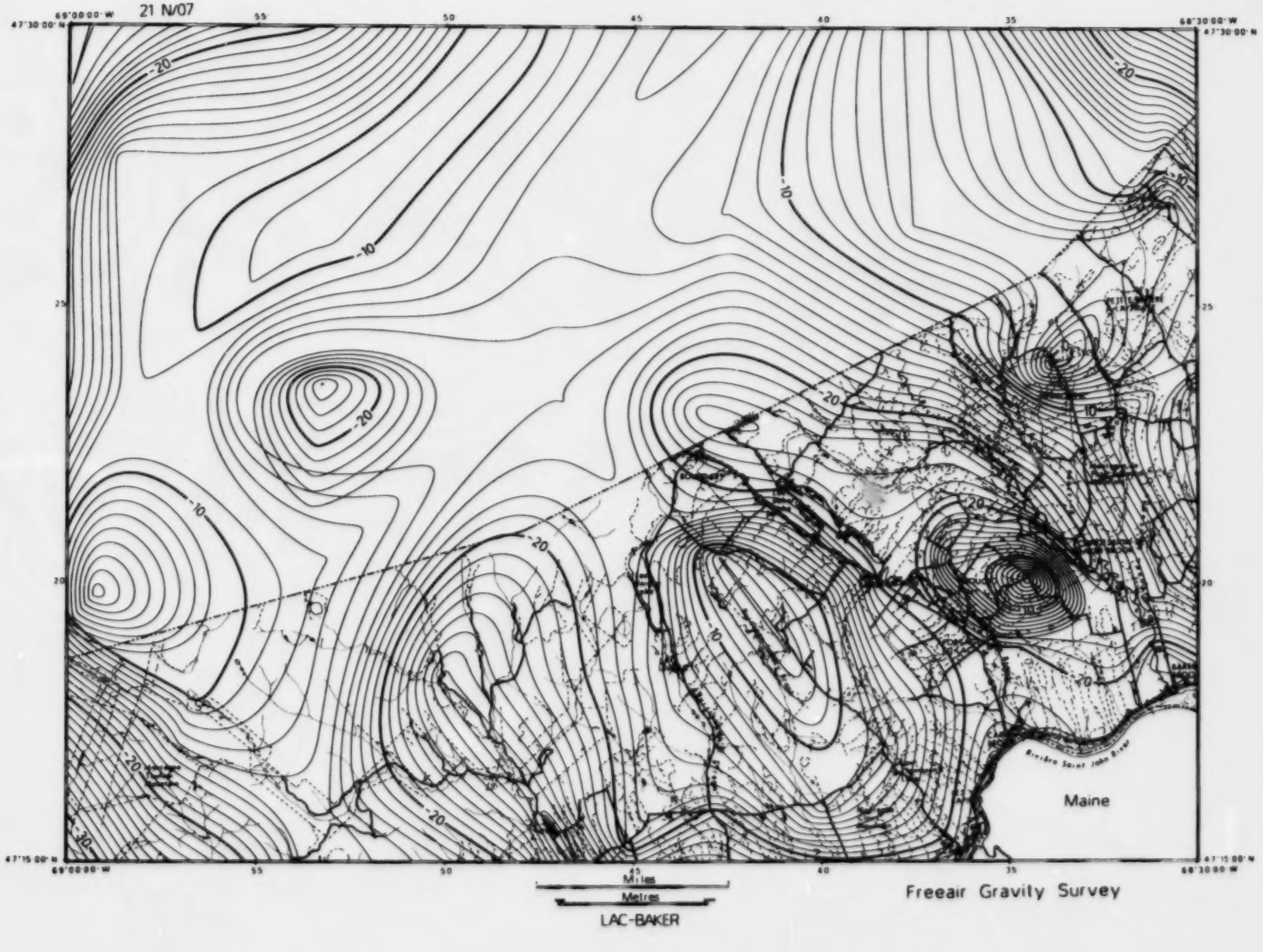


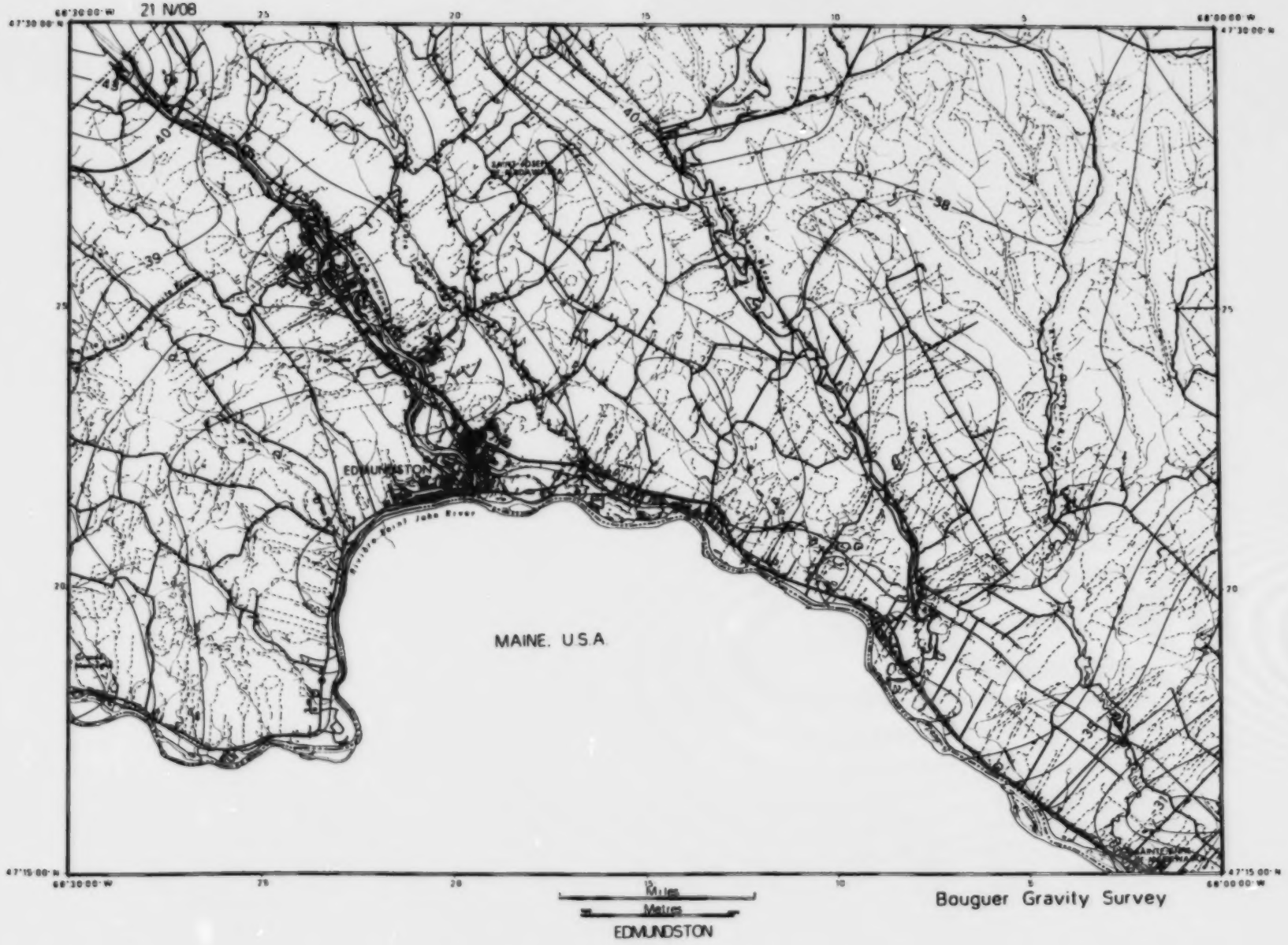
Freeair Gravity Survey


21 N/06
69°30'00"W
69°00'00"W
47°30'00"N
47°15'00"N
-47
-49
-48
-50
-54
Quebec
MAINE, U.S.A
Miles
Metres
ESTCOURT
Bouguer Gravity Survey

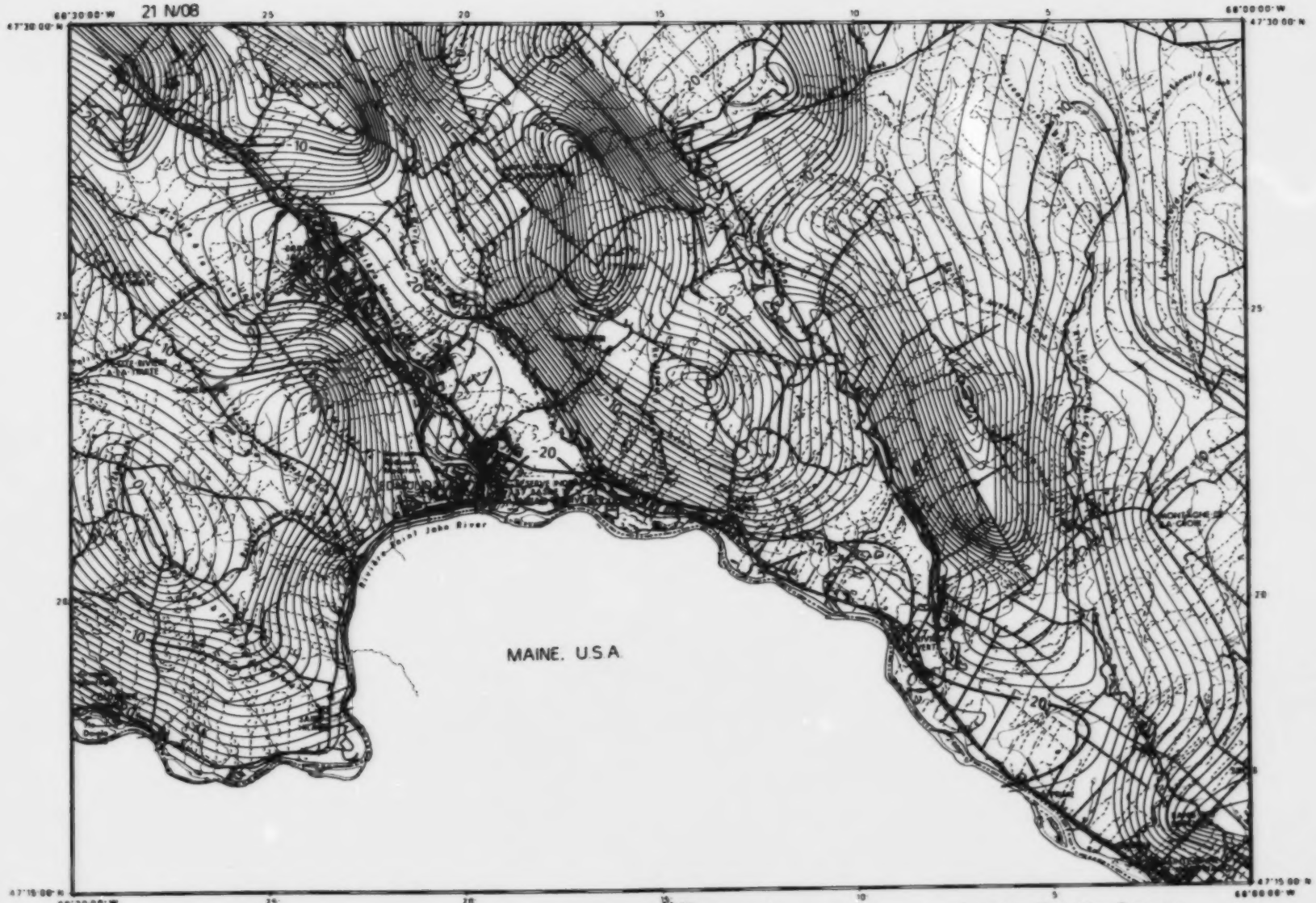

21 N/06
69°30'00" W
47°30'00" N
25
20
15
10
5
69°00'00" W
-10
-20
-20
25
20
MAINE. USA
47°15'00" N
Miles
Metres
ESTCOURT
Freeair Gravity SUrvey


21 N/07
69°00'00" W
47°30'00" N
55'
50'
45'
40'
35'
68°30'00" W
47°15'00" N
25'
20'
50
Maine
Rivière Saint John River
15
Miles
Metres
LAC-BAKER
Bouguer Gravity Survey

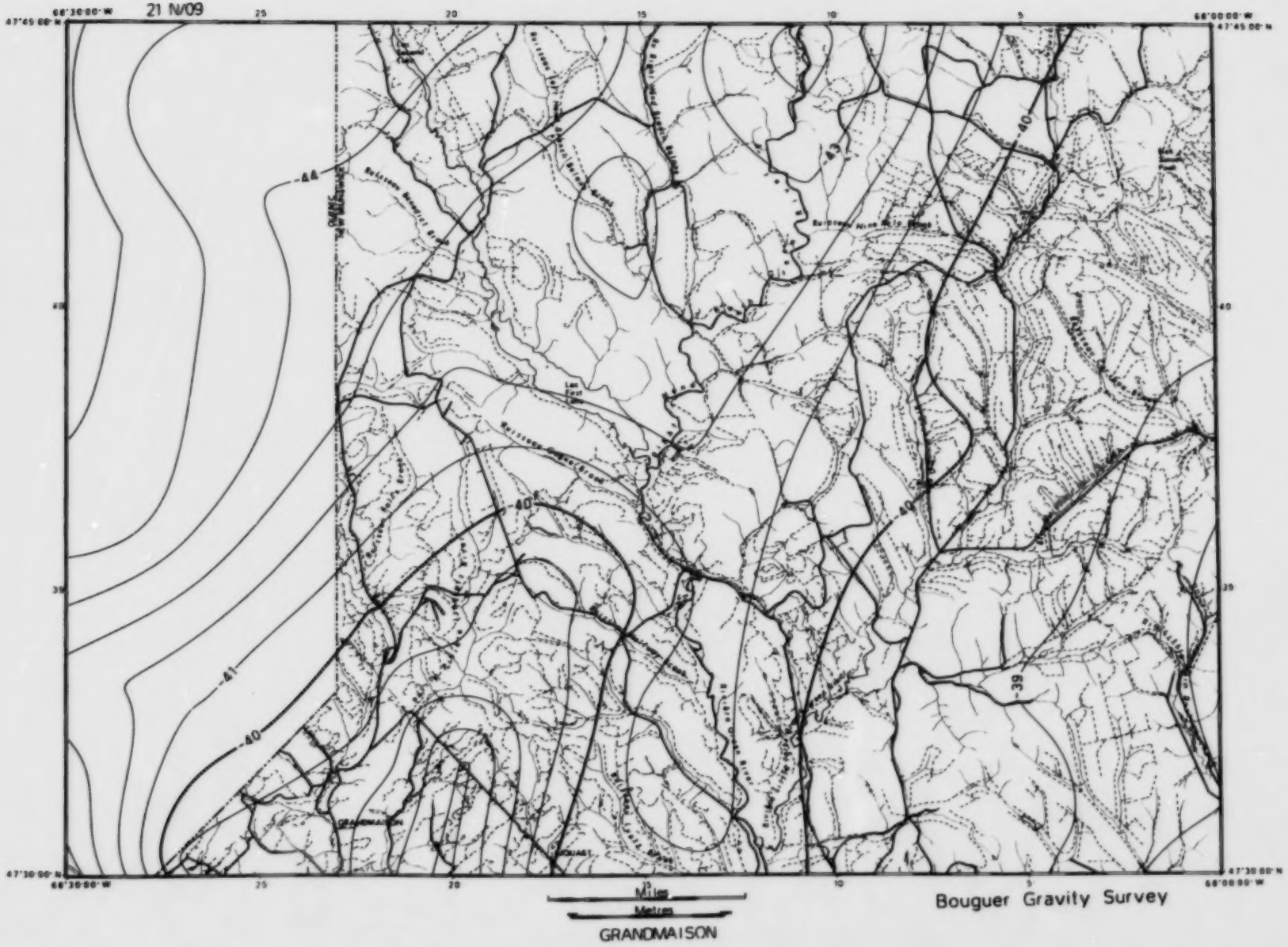

21 N/07
69°00'00" W
47°30'00" N
55
50
45
40
35
68°30'00" W
47°15'00" N
Maine
Miles
Metres
LAC-BAKER
Freeair Gravity Survey



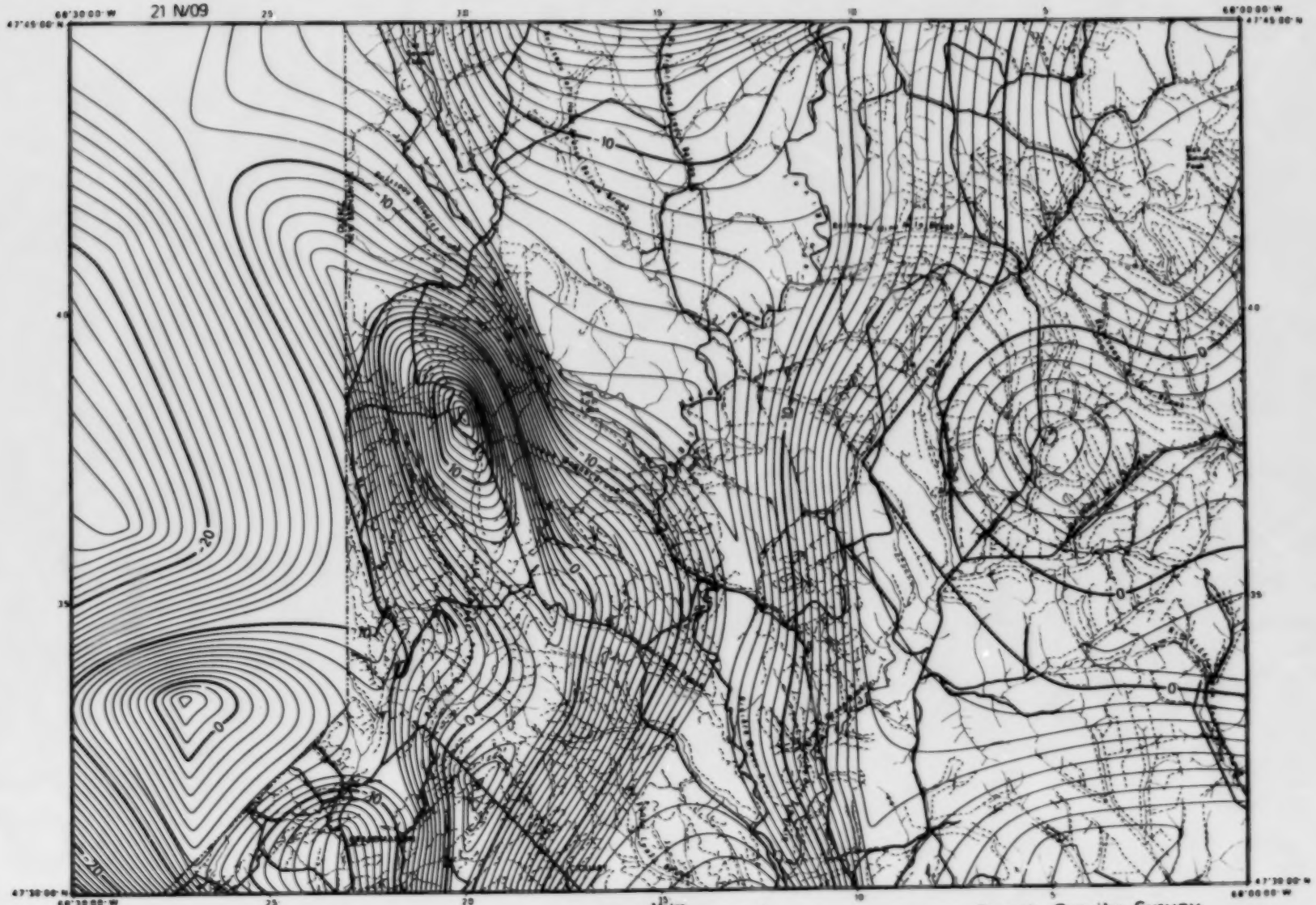
Bouguer Gravity Survey

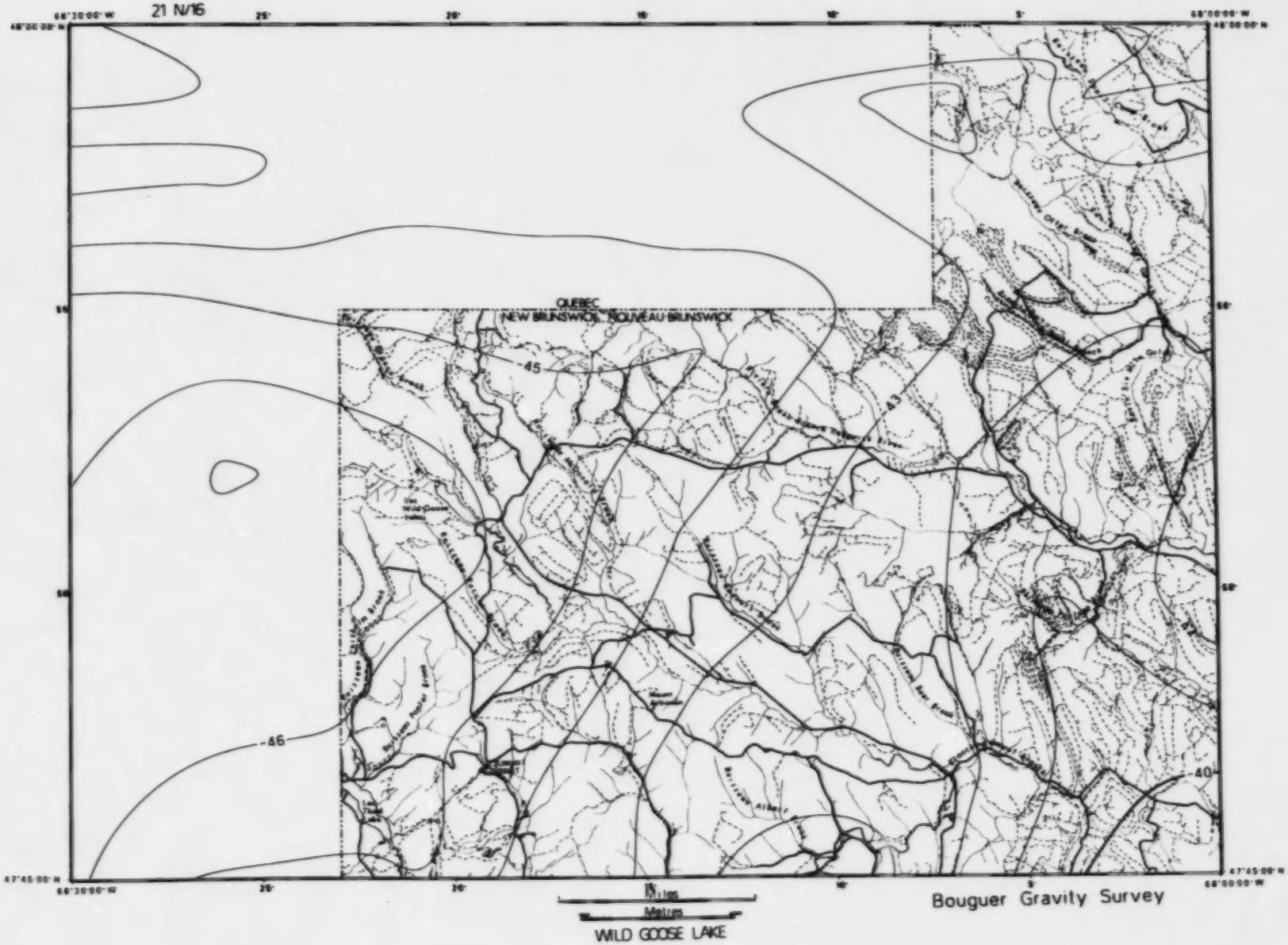


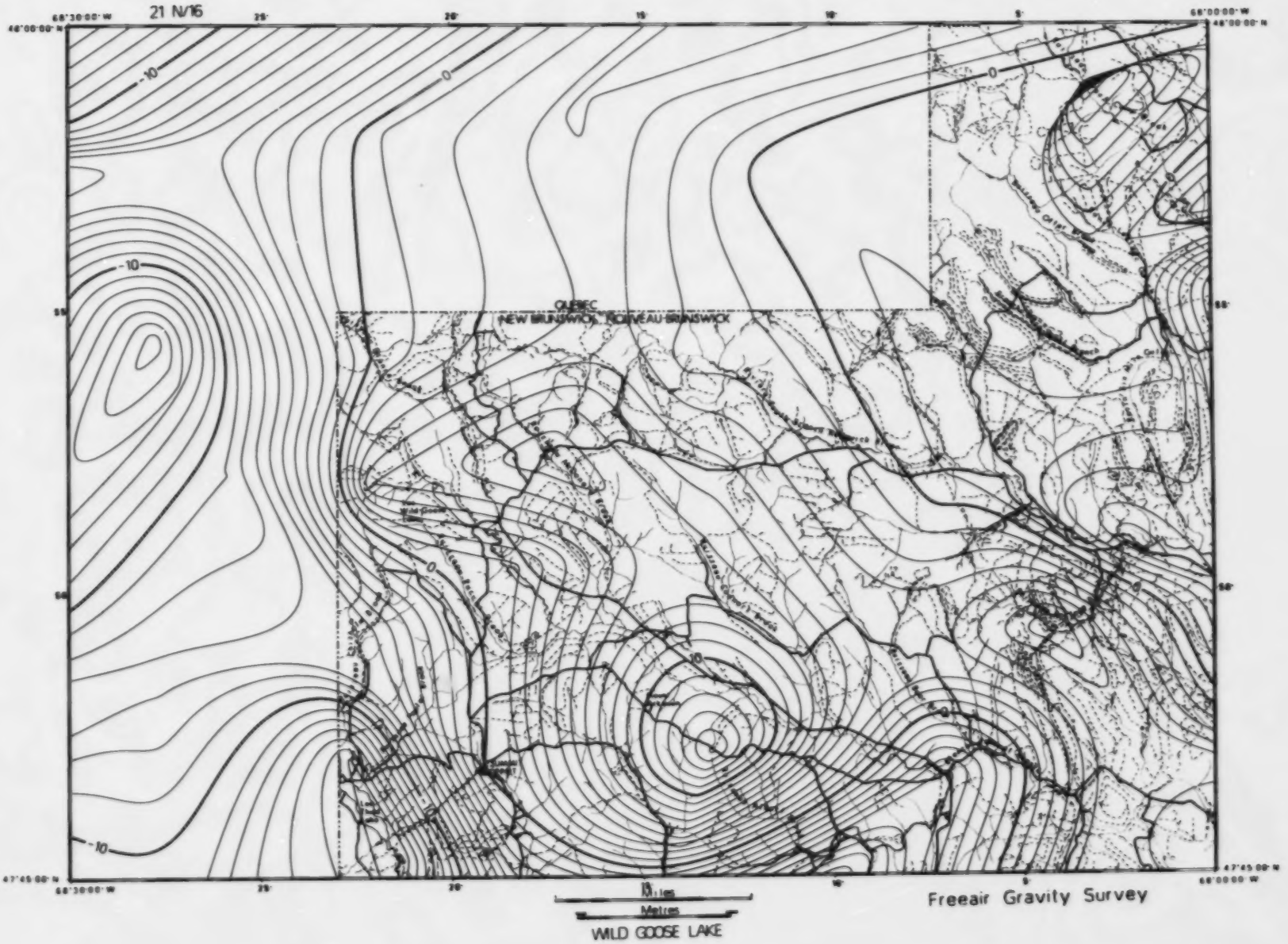
Freeair Gravity Survey

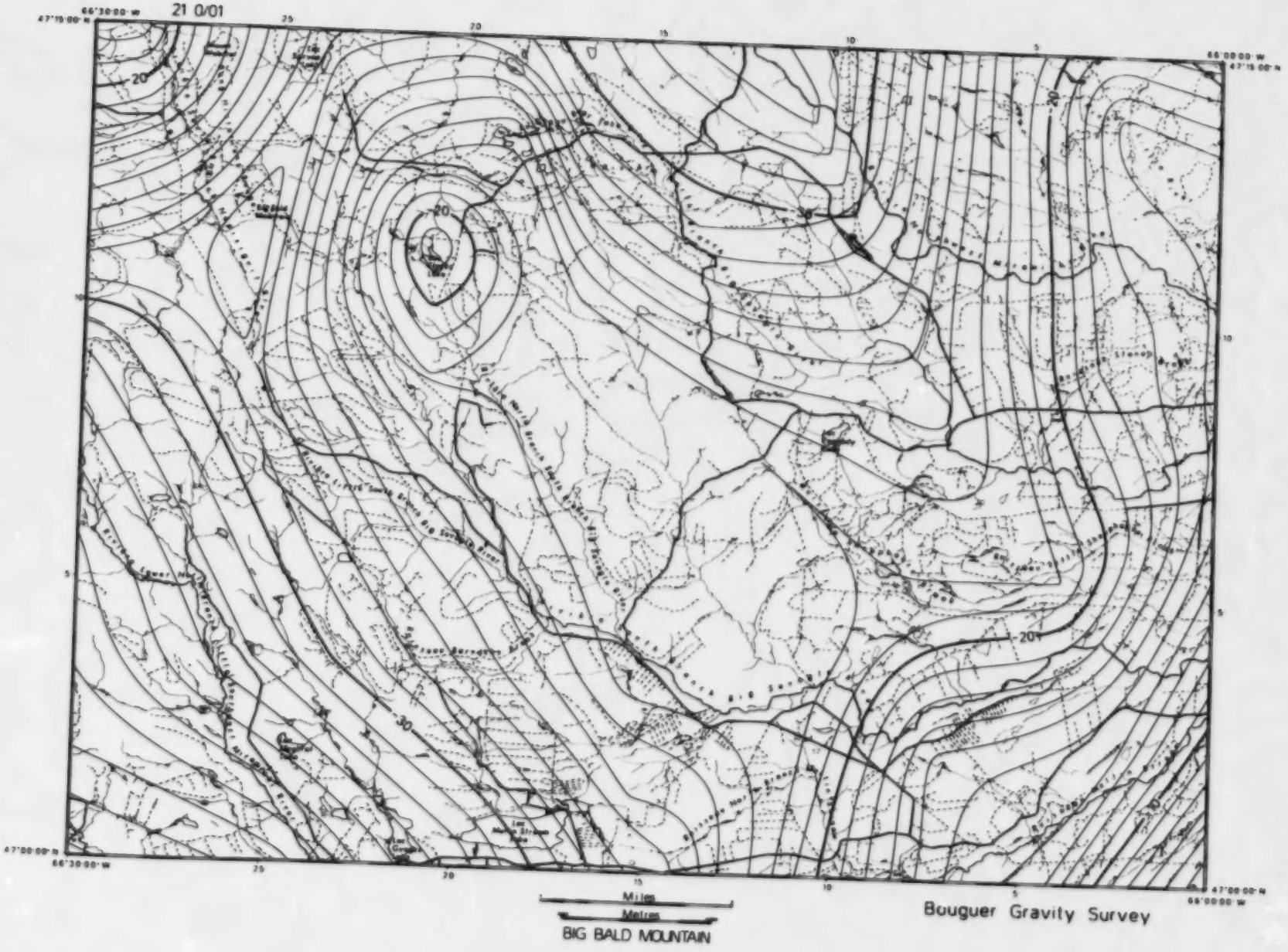


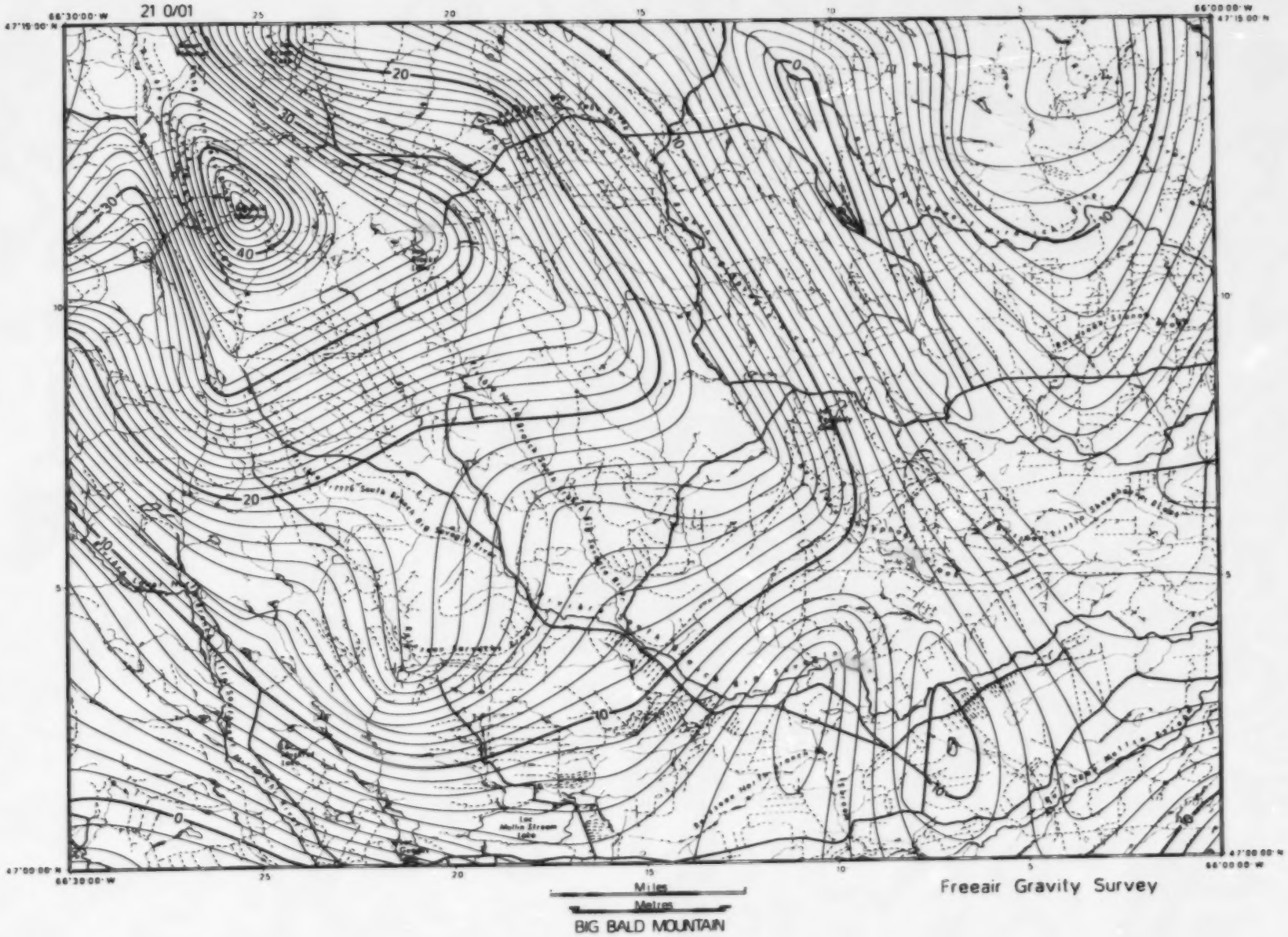
Bouguer Gravity Survey

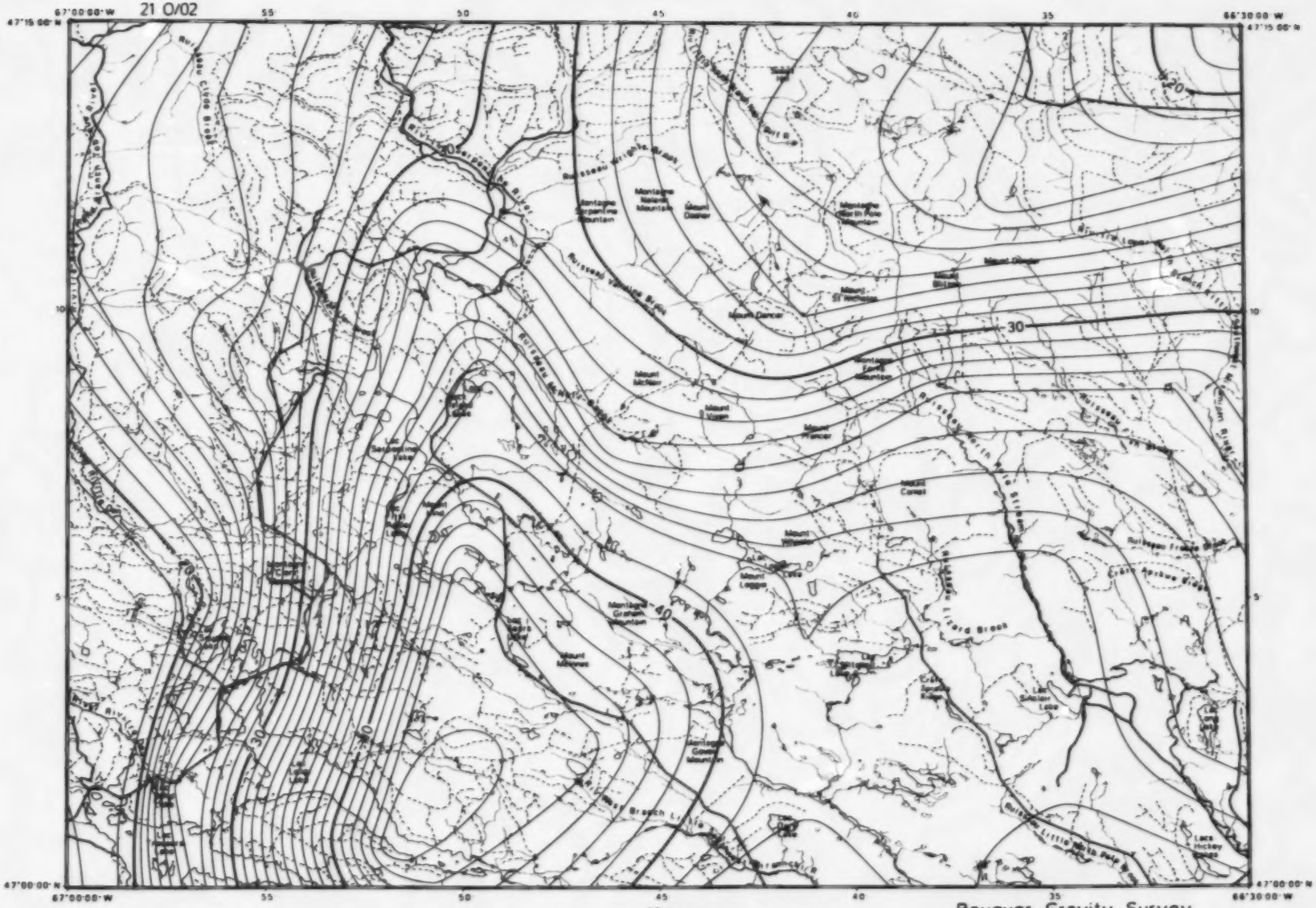

21 N/09
68°30'00"W
47°45'00"N
68°00'00"W
47°30'00"N
-10
-20
0
10
Miles
Metres
GRANDMAISON
Freeair Gravity Survey

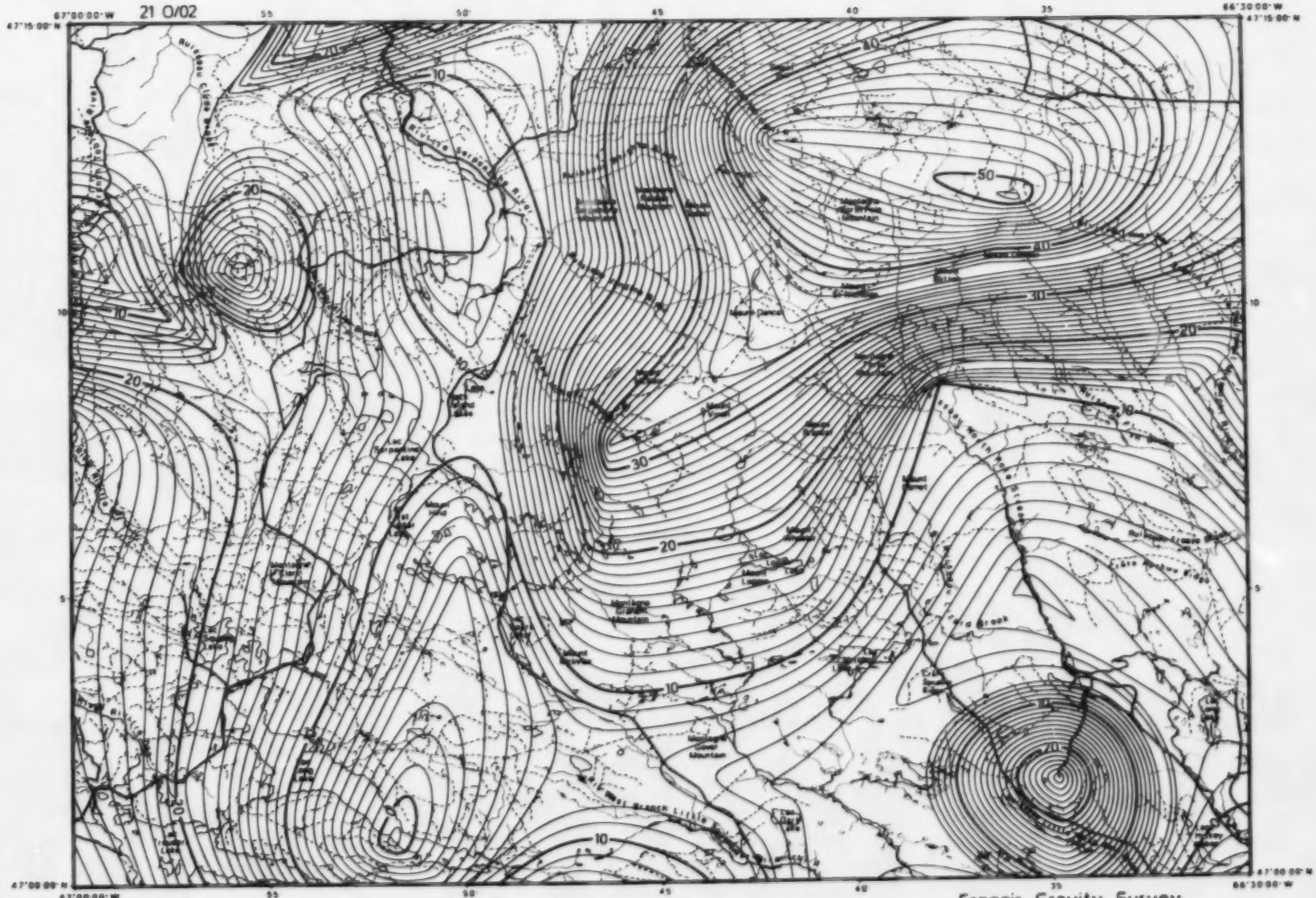

21 N/16
QUEBEC
NEW BRUNSWICK NOUVEAU-BRUNSWICK
-45
-43
-46
-40
Miles
Metres
WILD GOOSE LAKE
Bouguer Gravity Survey

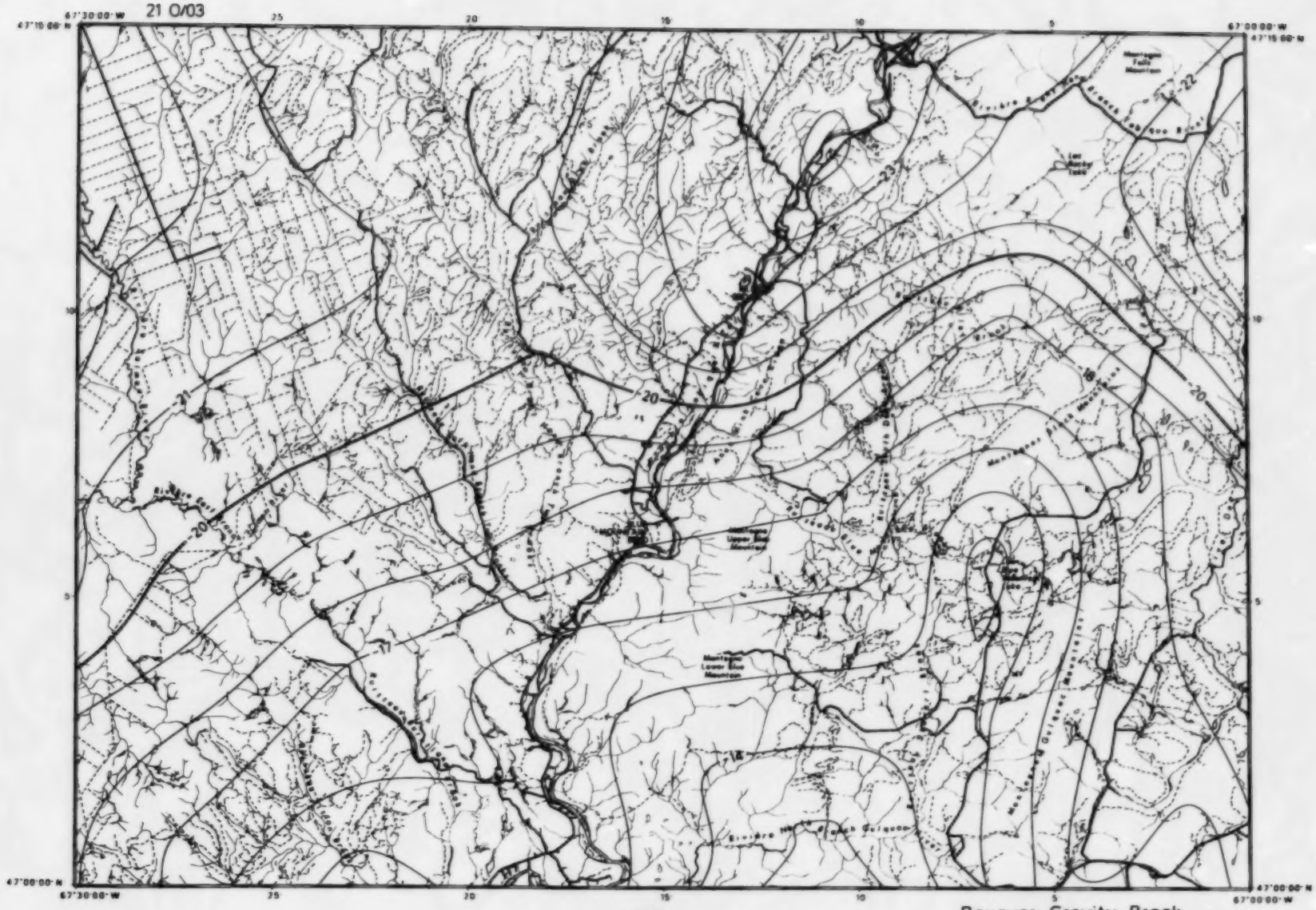

21 N/16
68°30'00" W
68°00'00" W
48°00'00" N
47°45'00" N
-10
0
10
QUEBEC
NEW BRUNSWICK / NOUVEAU-BRUNSWICK
15 Miles
Metres
WILD GOOSE LAKE
Freeair Gravity Survey

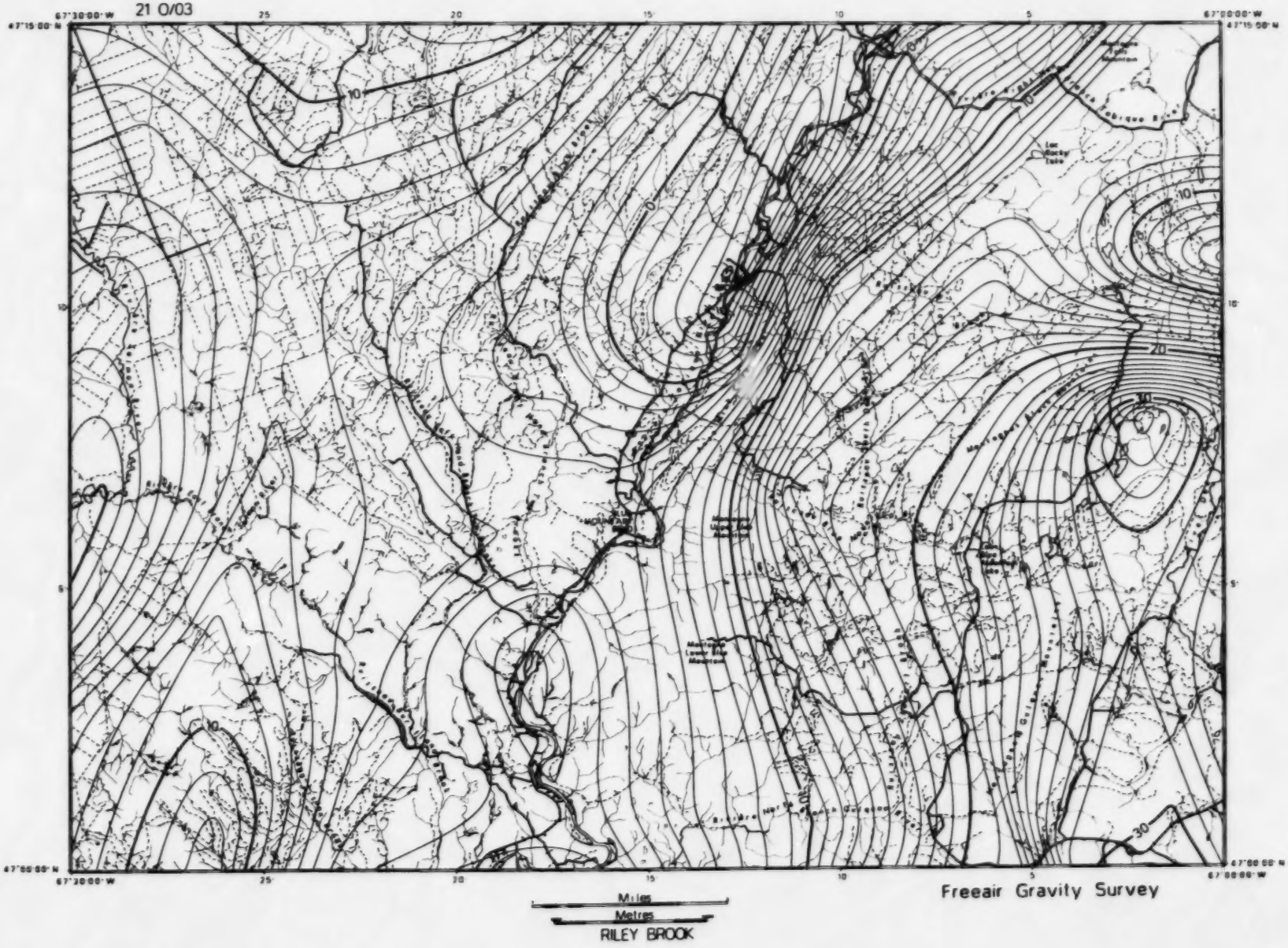

21 0/01
66°30'00" W
47°15'00" N
66°00'00" W
47°00'00" N
20
30
Miles
Metres
BIG BALD MOUNTAIN
Bouguer Gravity Survey

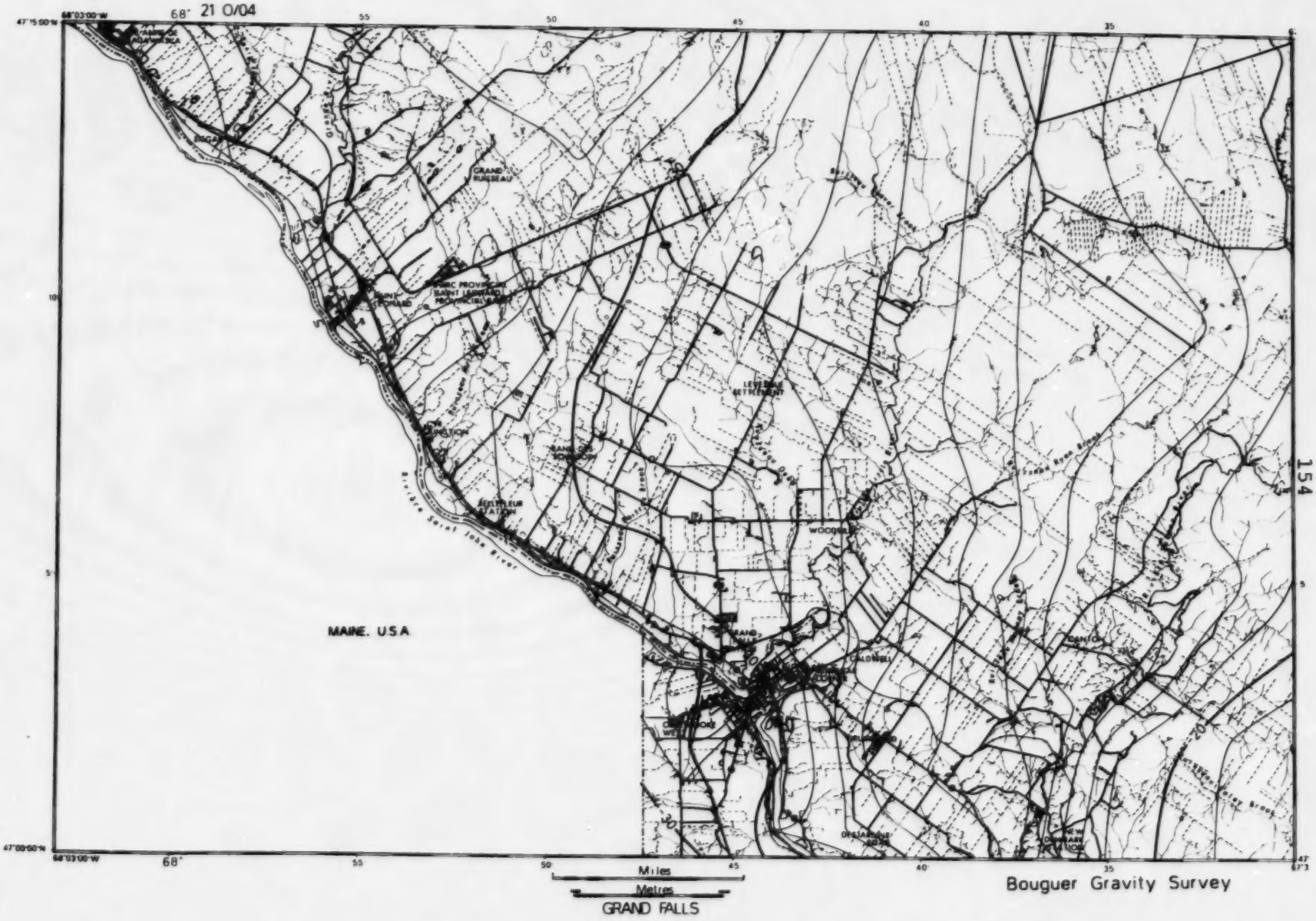

21 0/01
66°30'00" W
47°15'00" N
66°00'00" W
47°00'00" N
25
20
15
10
5
Miles
Metres
BIG BALD MOUNTAIN
Freeair Gravity Survey

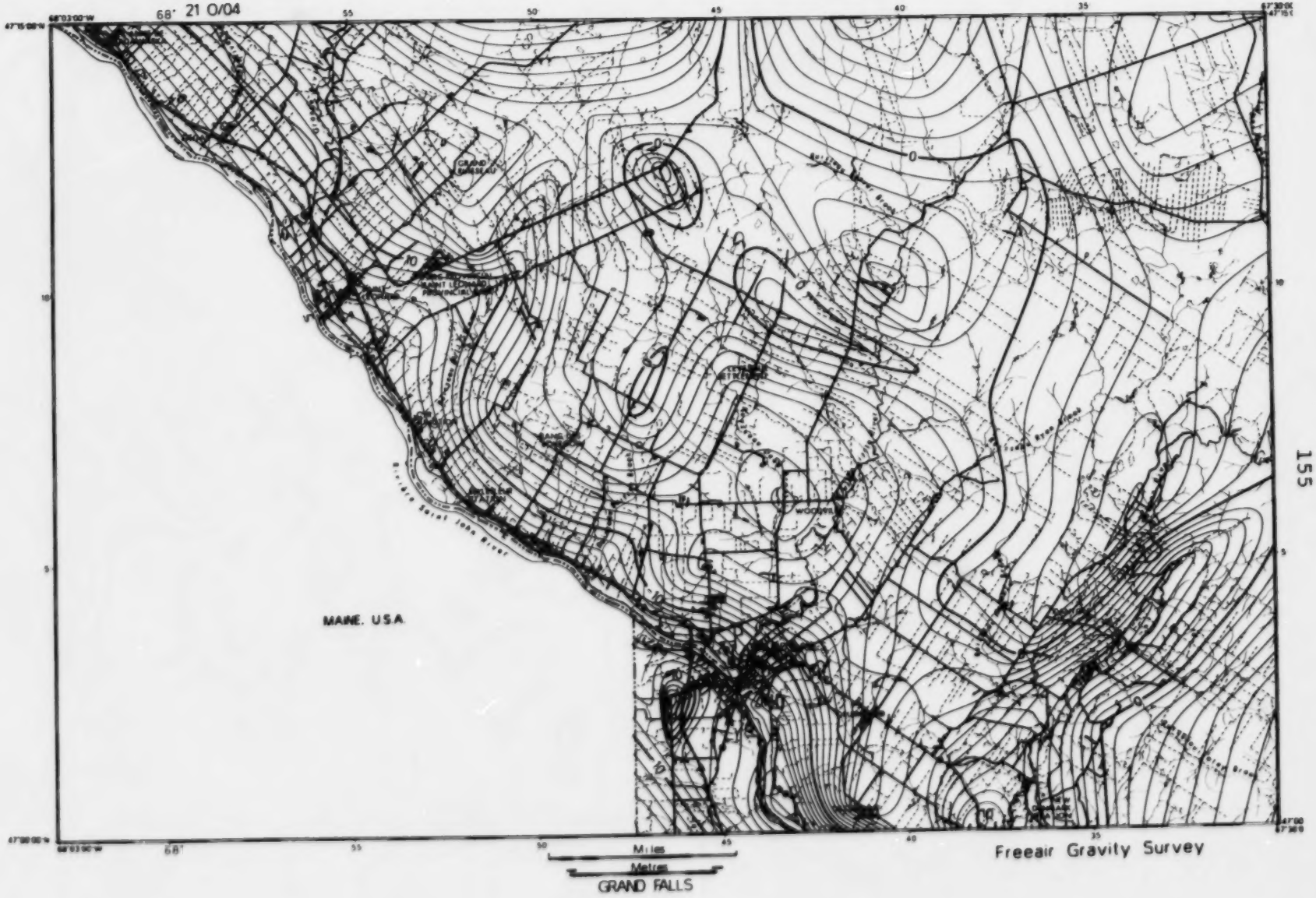

21 O/02
67°00'00"W
47°15'00"N
47°00'00"N
66°30'00"W
55
50
45
40
35
10
5
20
30
40
50
60
70
Miles
Metres
SERPENTINE LAKE
Bouguer Gravity Survey

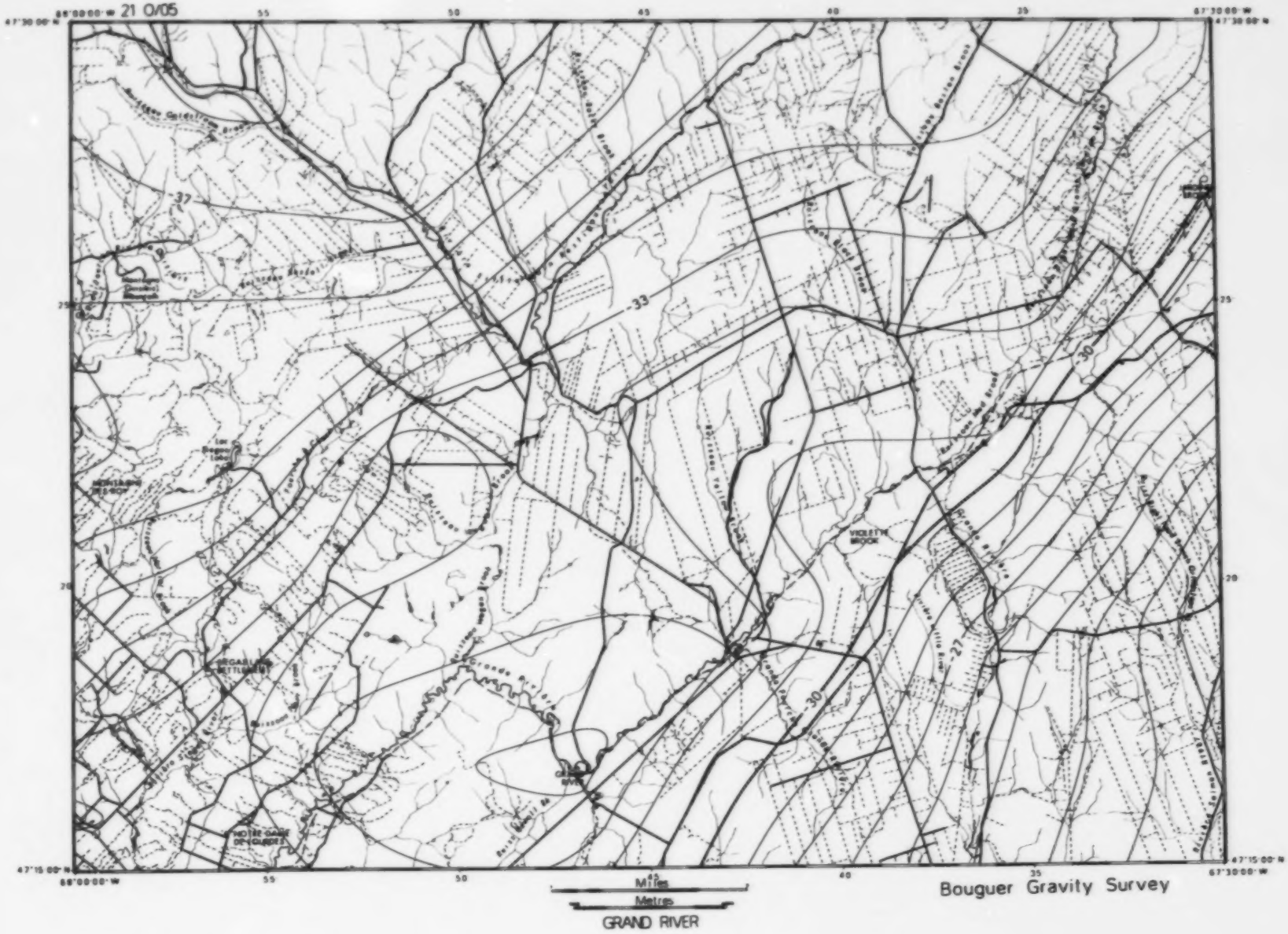

21 O/02
67°00'00"W
66°30'00"W
47°15'00"N
47°00'00"N
55
50
45
40
35
10
5
Miles
Metres
Freeair Gravity Survey
SERPENTINE LAKE

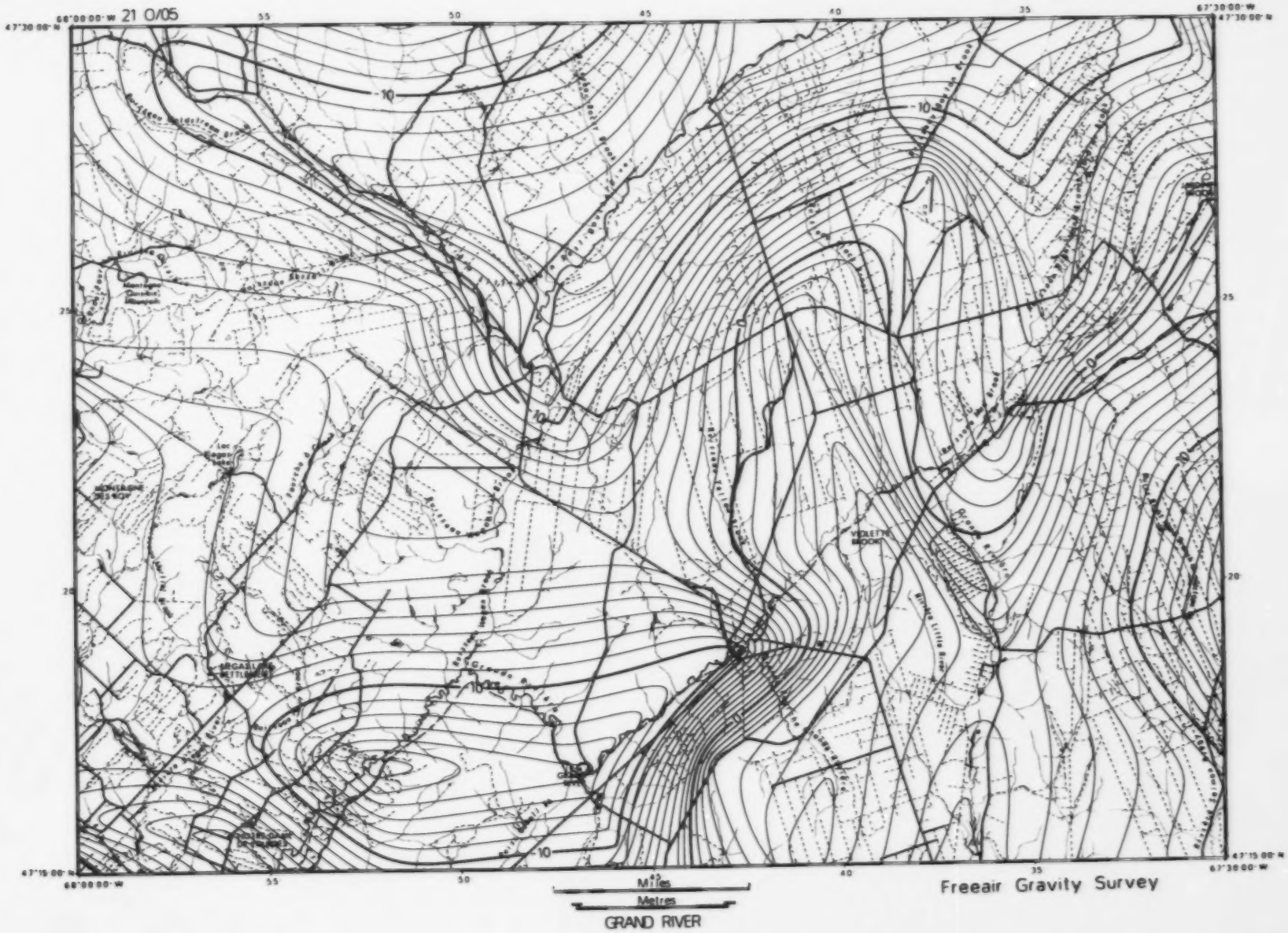

21 O/03
67°30'00"W
67°15'00"N
67°00'00"N
25
20
15
10
5
22
20
18
Miles
Metres
RILEY BROOK
Bouguer Gravity Brook

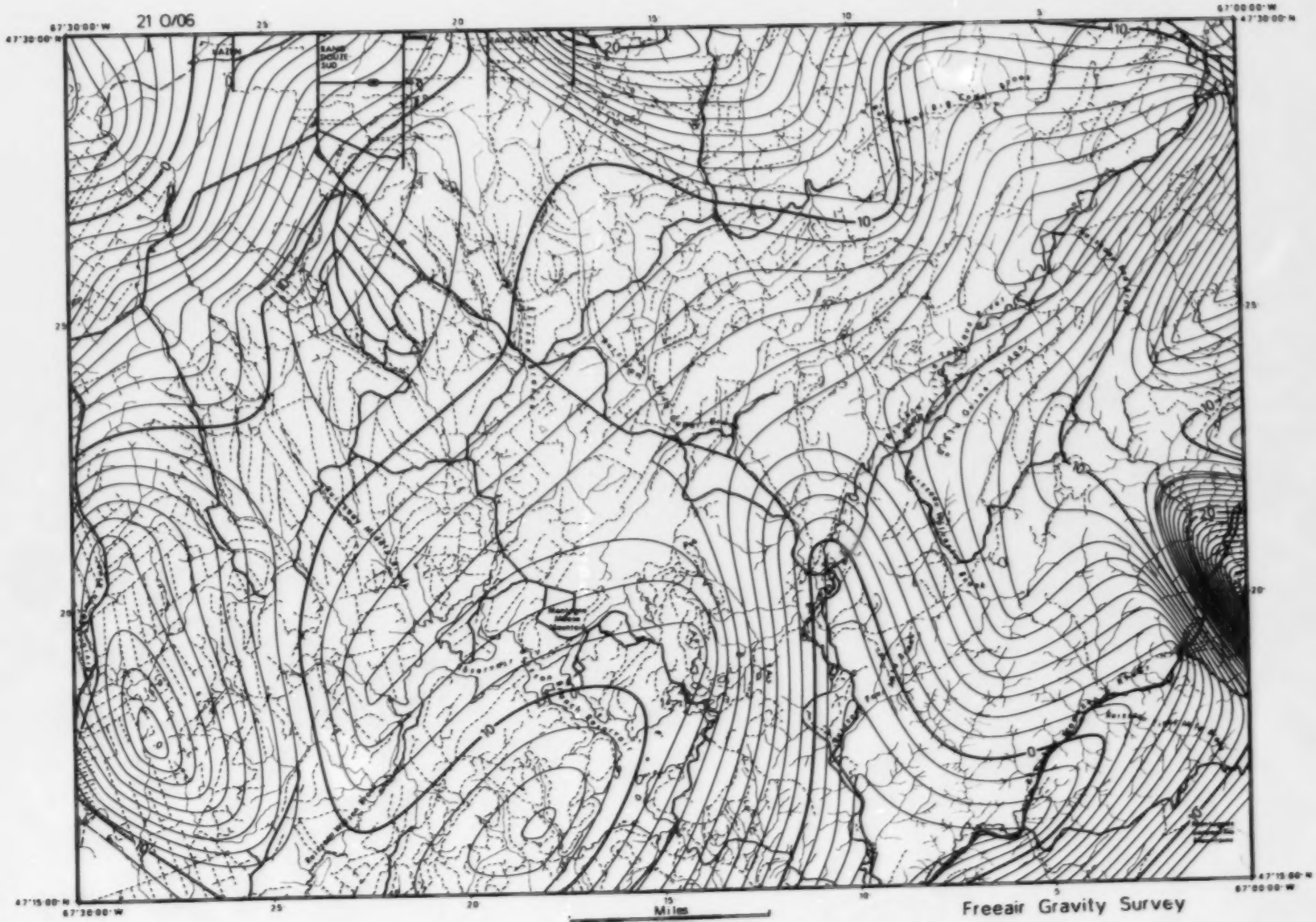

21 O/03
67°30'00"W
67°00'00"W
47°15'00"N
47°00'00"N
25
20
15
10
5
Miles
Metres
RILEY BROOK
Freeair Gravity Survey

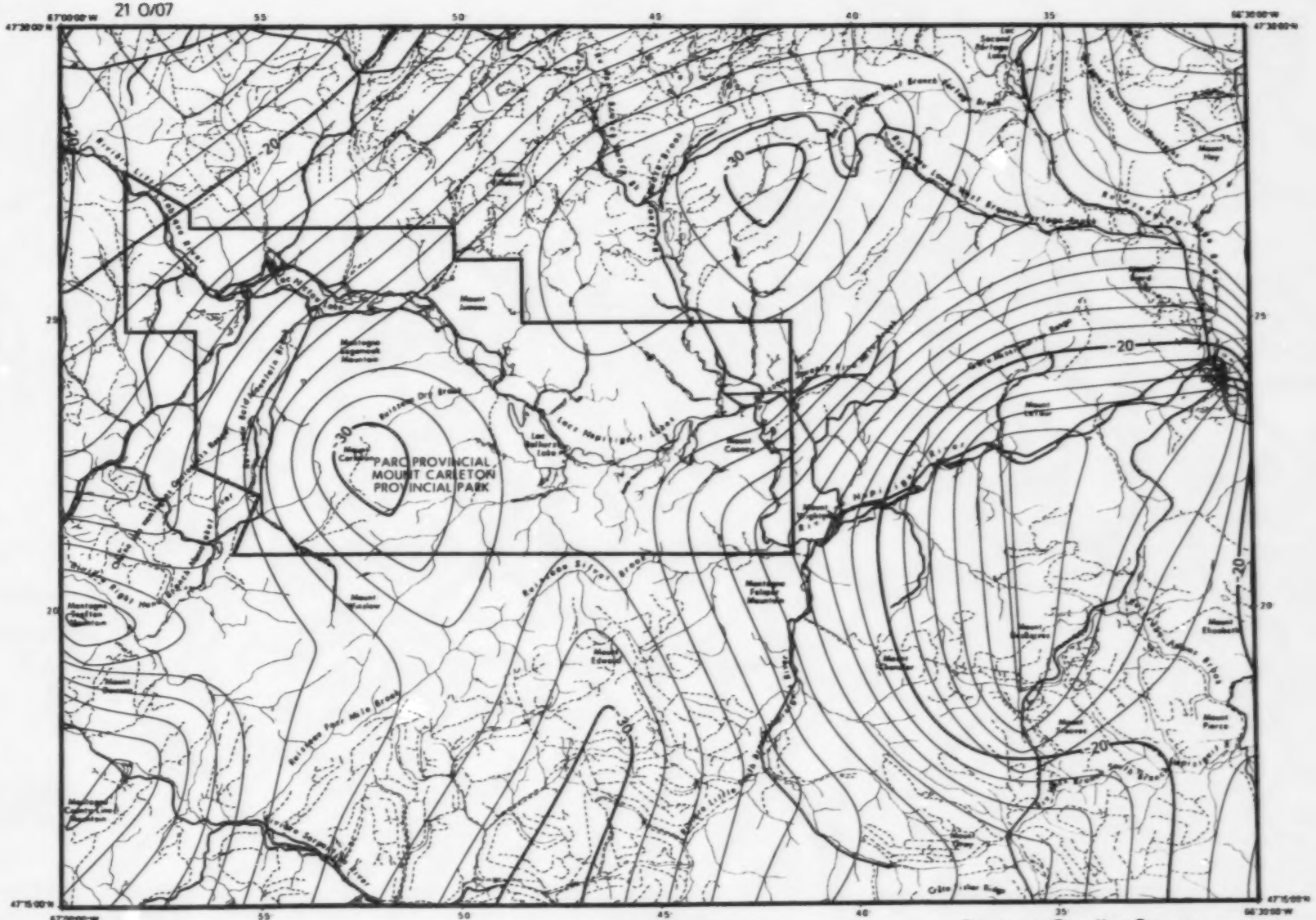

68° 21 0/04
MAINE, USA
Miles
Metres
GRAND FALLS
Bouguer Gravity Survey

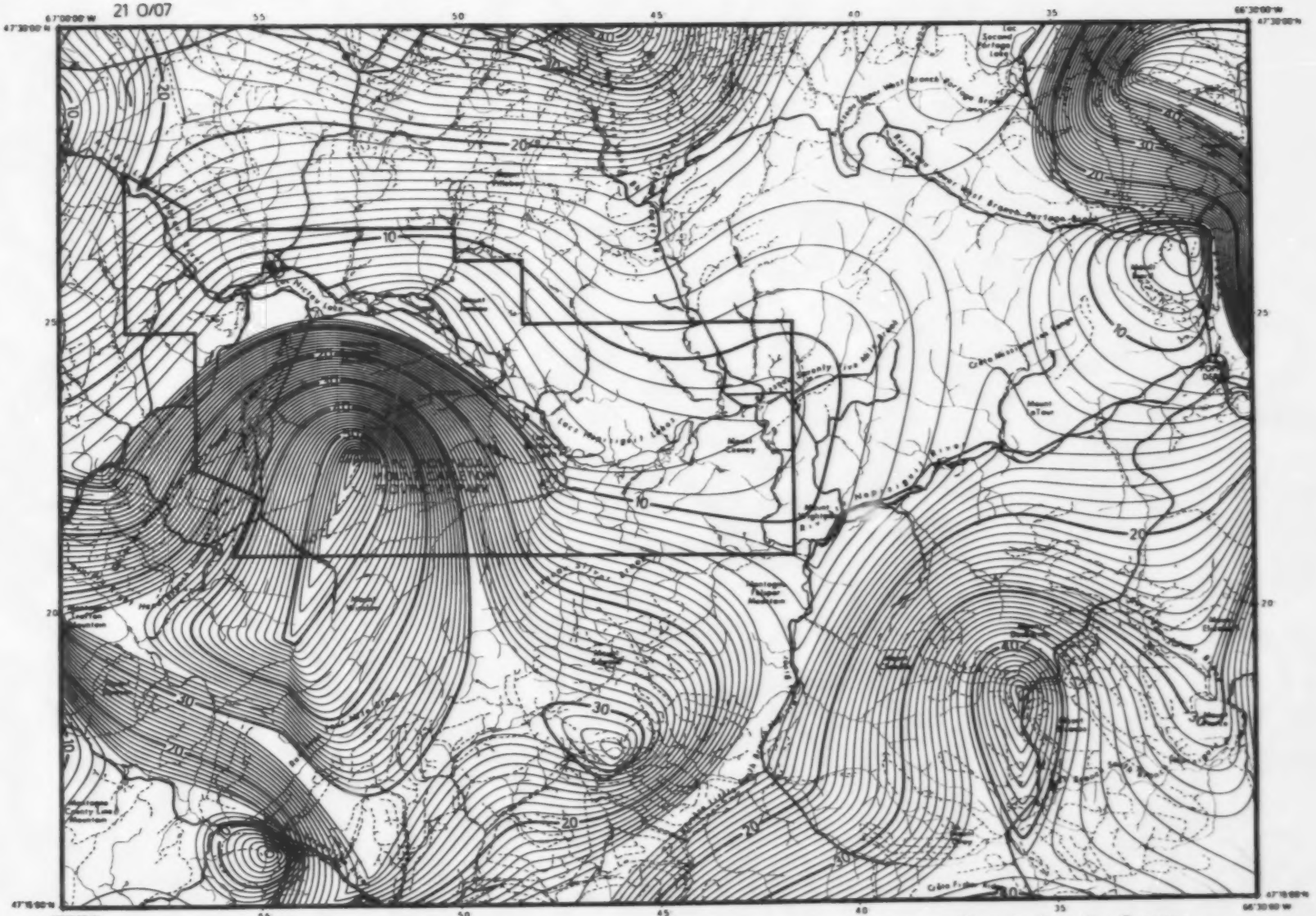

68° 21 0/04
MAINE. U.S.A.
Miles
Metres
GRAND FALLS
Freeair Gravity Survey

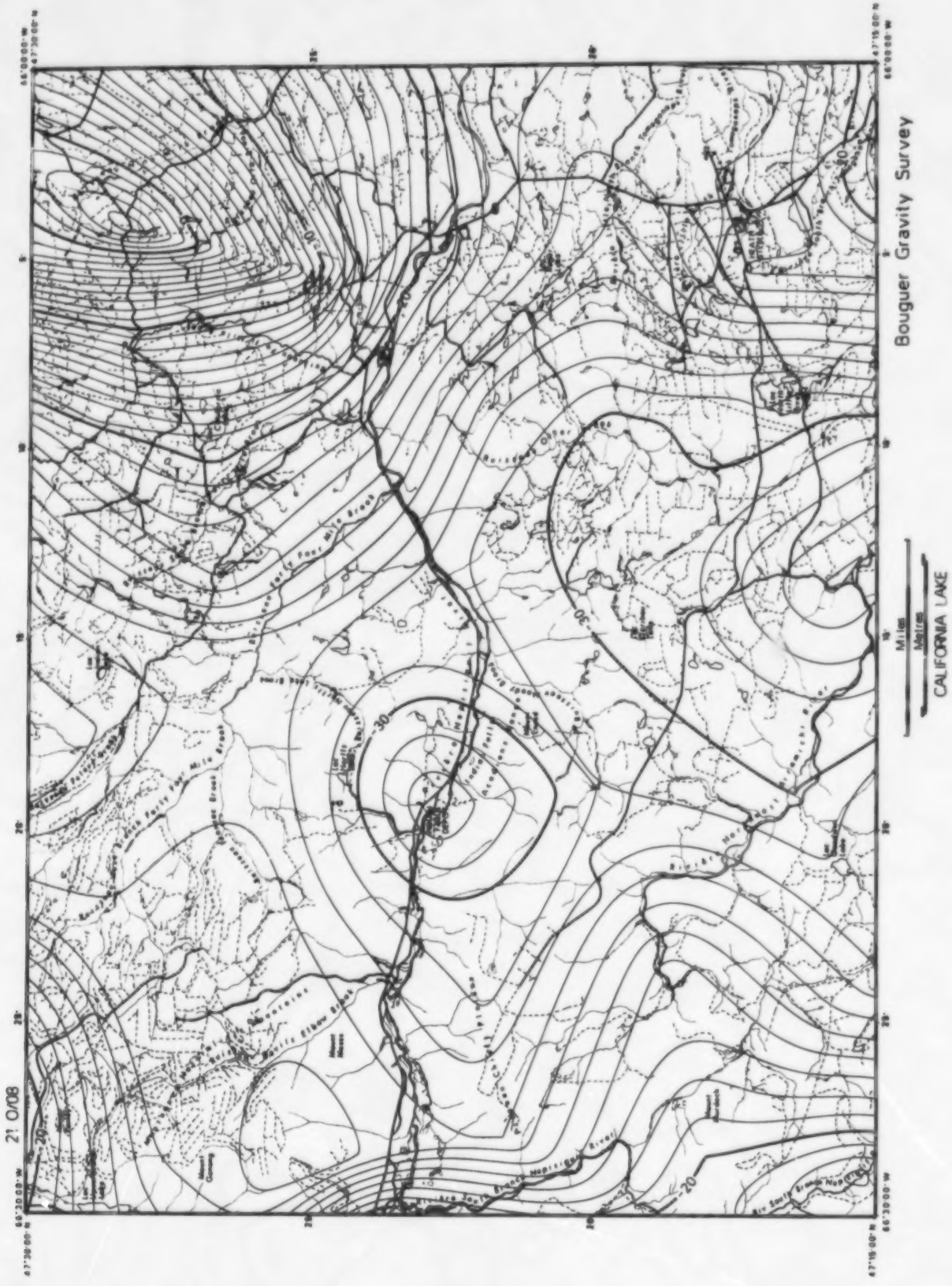

21 O/05
-37
-33
-30
-27
-30
Miles
Metres
GRAND RIVER
Bouguer Gravity Survey

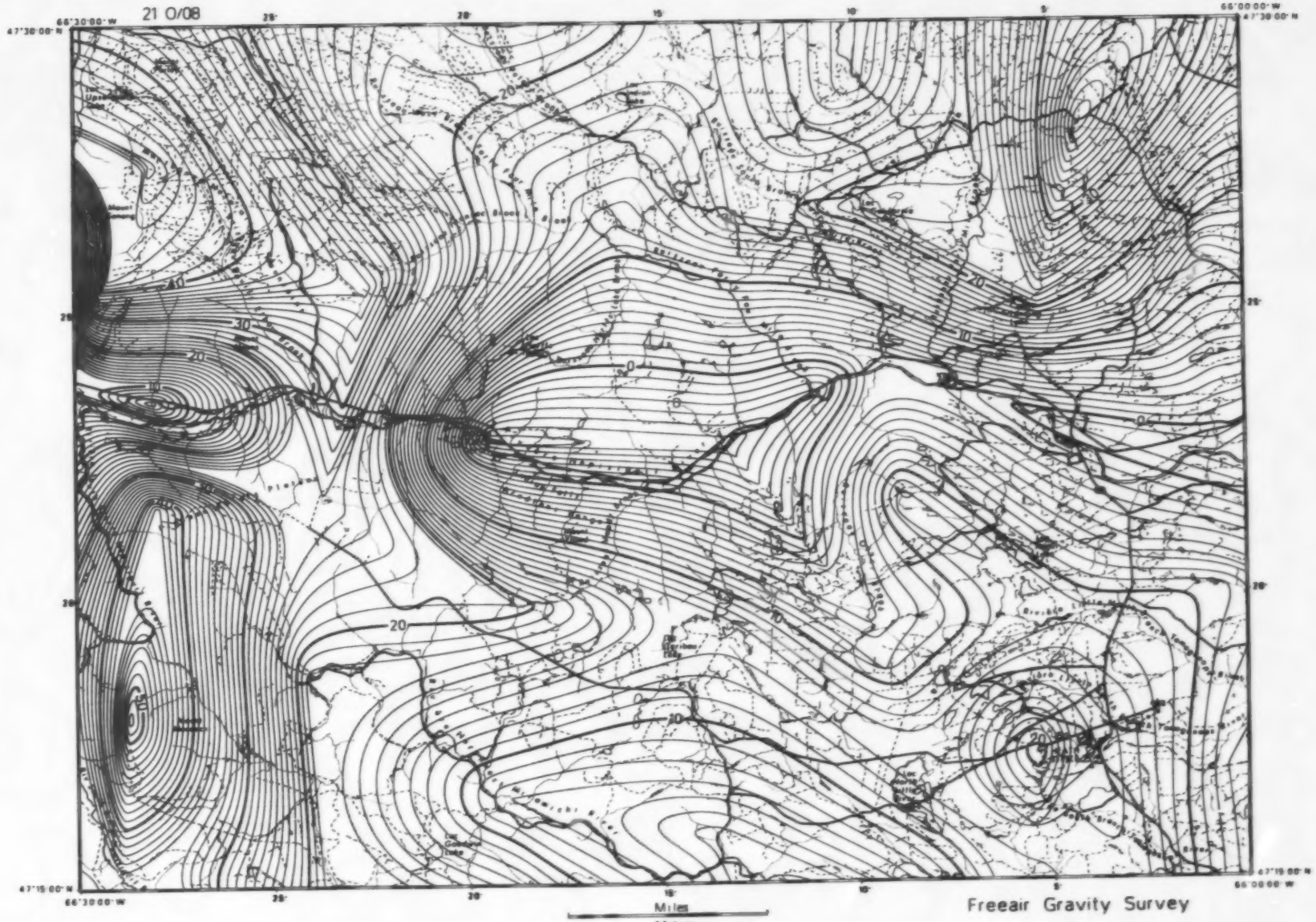

21 O/05
68°00'00" W
67°30'00" W
47°30'00" N
47°15'00" N
55
50
45
40
35
25
20
10
Miles
Metres
GRAND RIVER
Freeair Gravity Survey

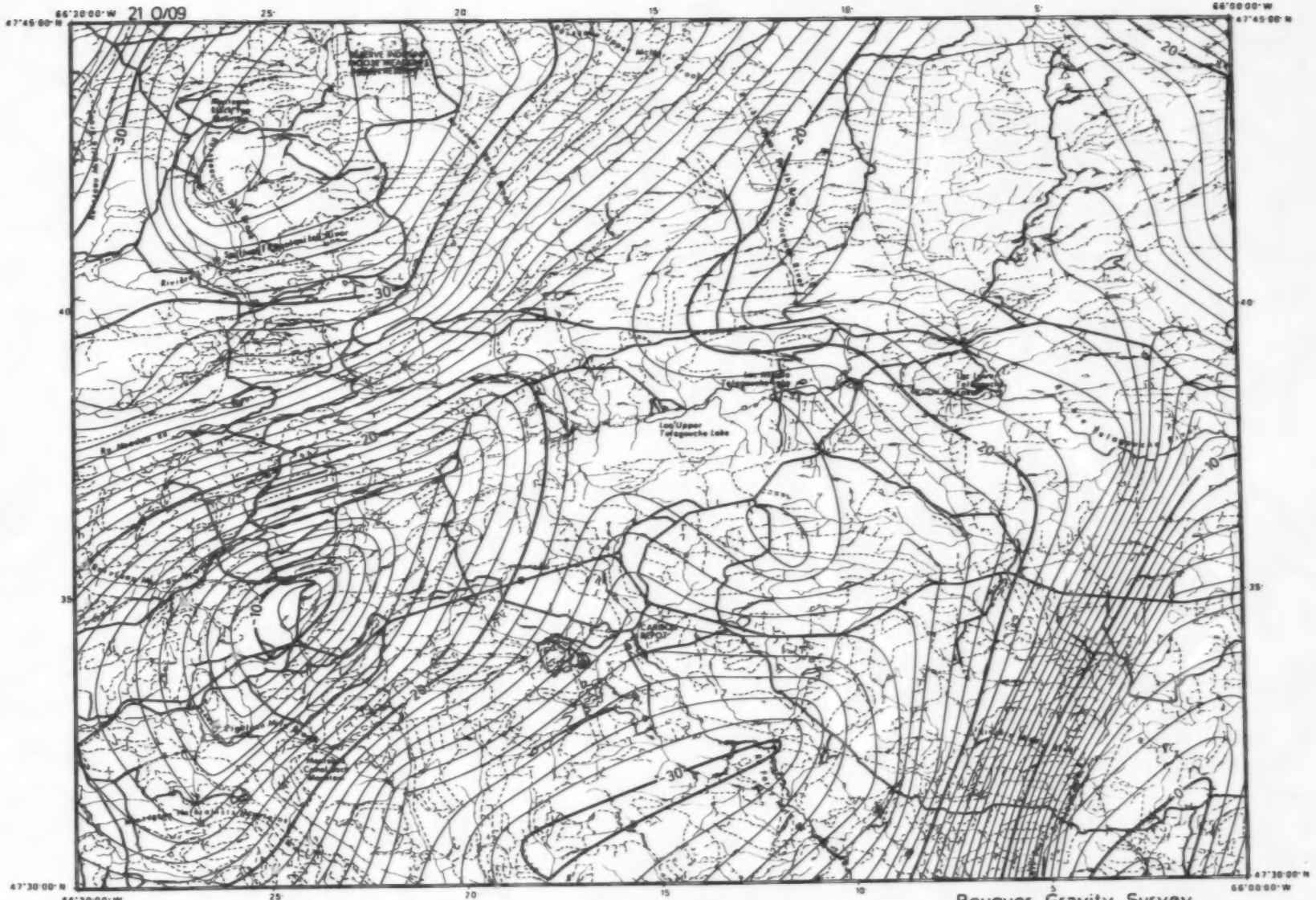

21 O/06
67°30'00"W
47°30'00"N
67°00'00"W
47°15'00"N
Miles
Metres
Freeair Gravity Survey
SISSON BRANCH RESERVOIR

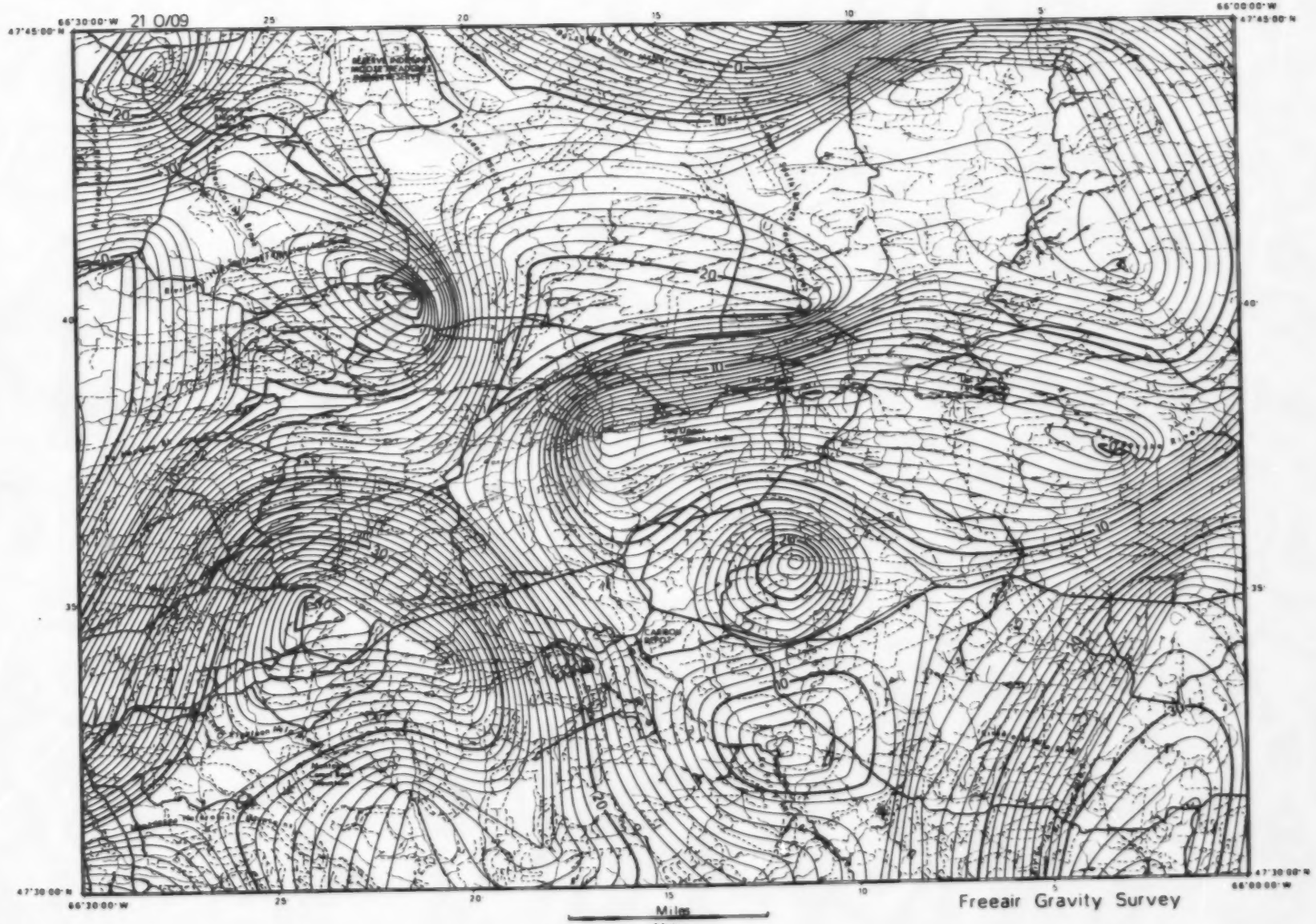

21 O/07
PARC PROVINCIAL
MOUNT CARLETON
PROVINCIAL PARK
-30
-20
-20
-20
-30
-30
Miles
Metres
NEPISIGUIT LAKES
Bouguer Gravity Survey

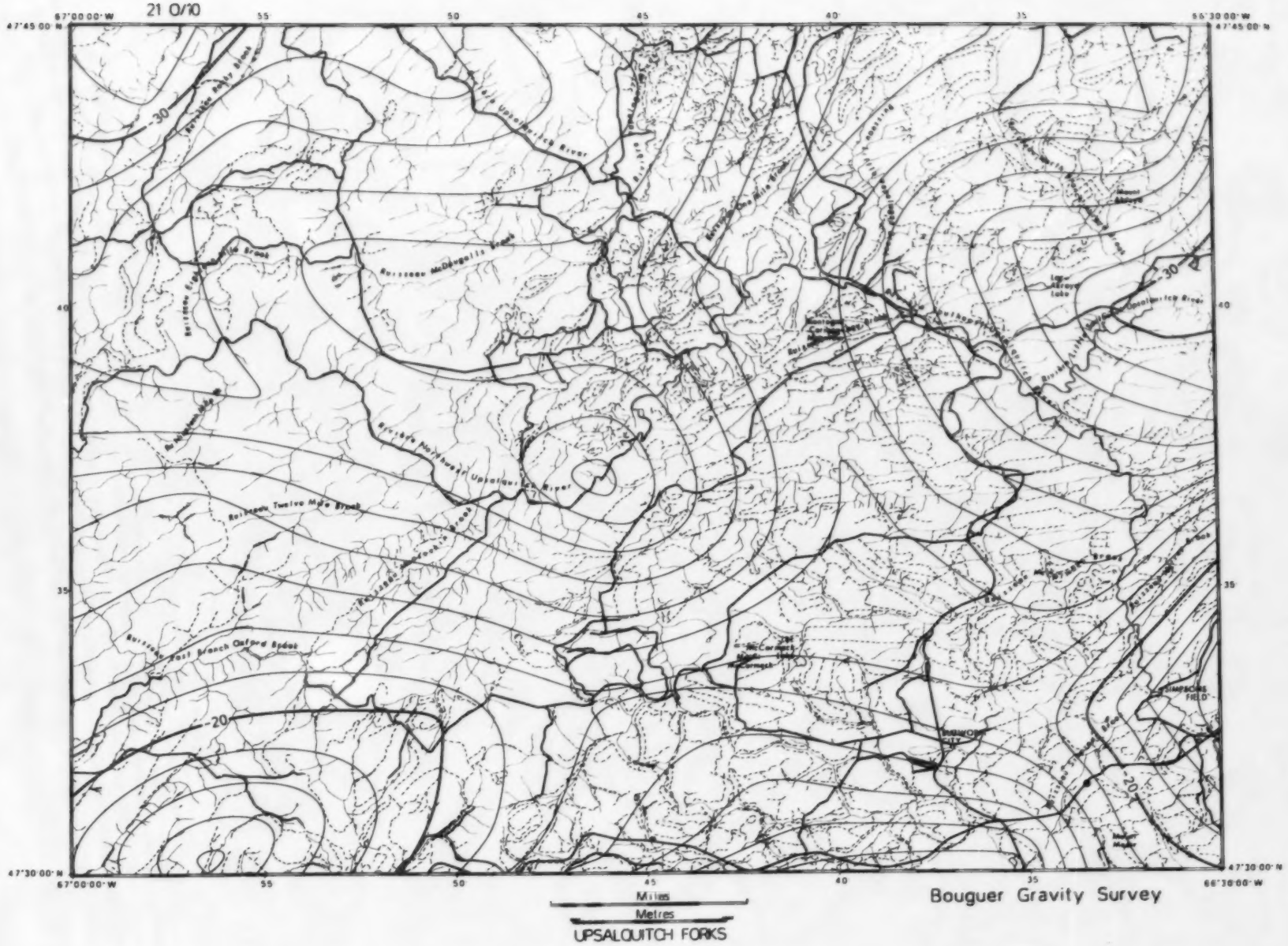

21 O/07
67°00'00"W
47°30'00"N
55
50
45
40
35
66°30'00"W
25
20
10
30
Miles
Metres
NEPISIGUIT LAKES
Freeair Gravity Survey

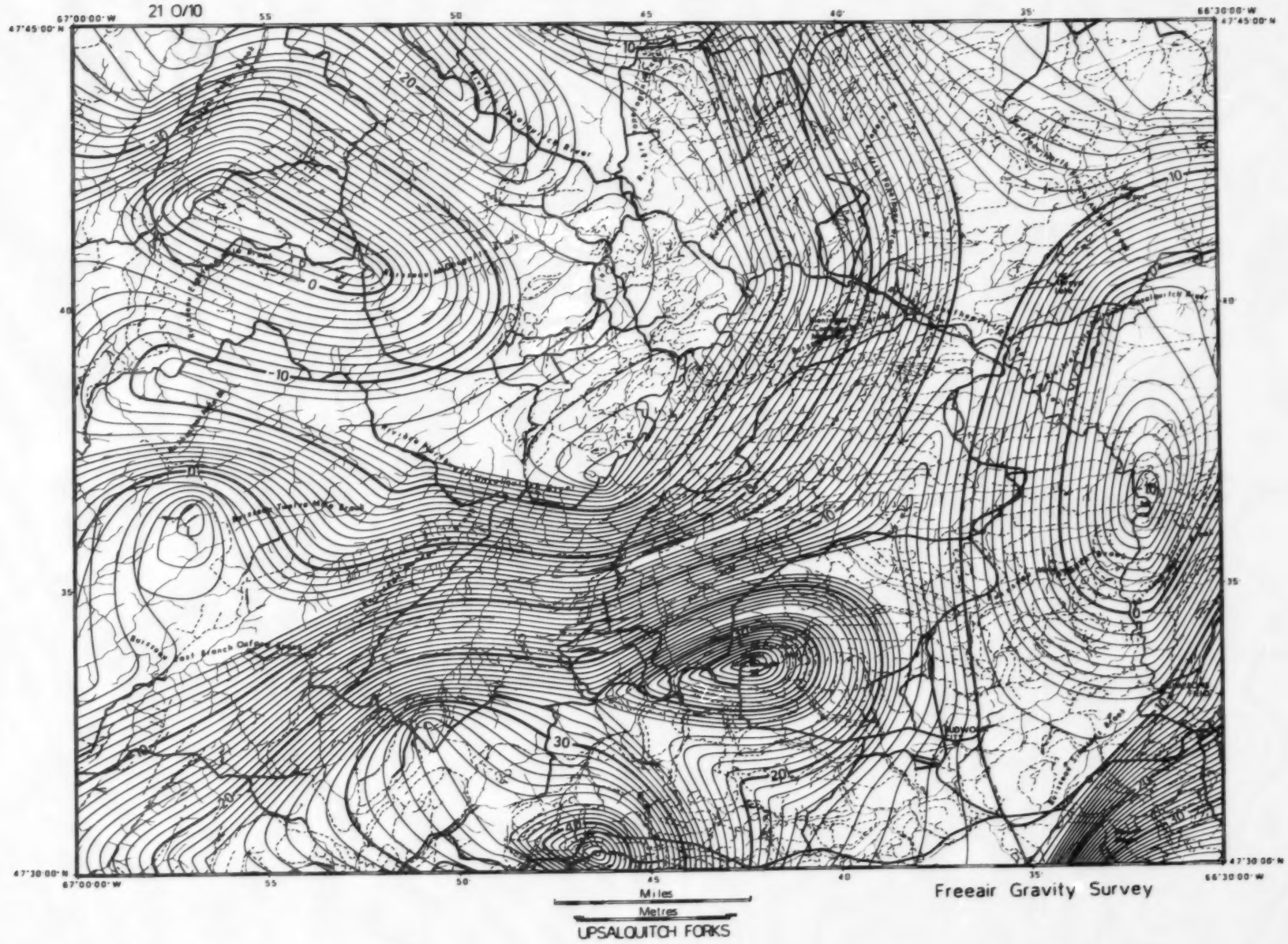

Bouguer Gravity Survey
Miles
Metres
CALIFORNIA LAKE
21 0/08

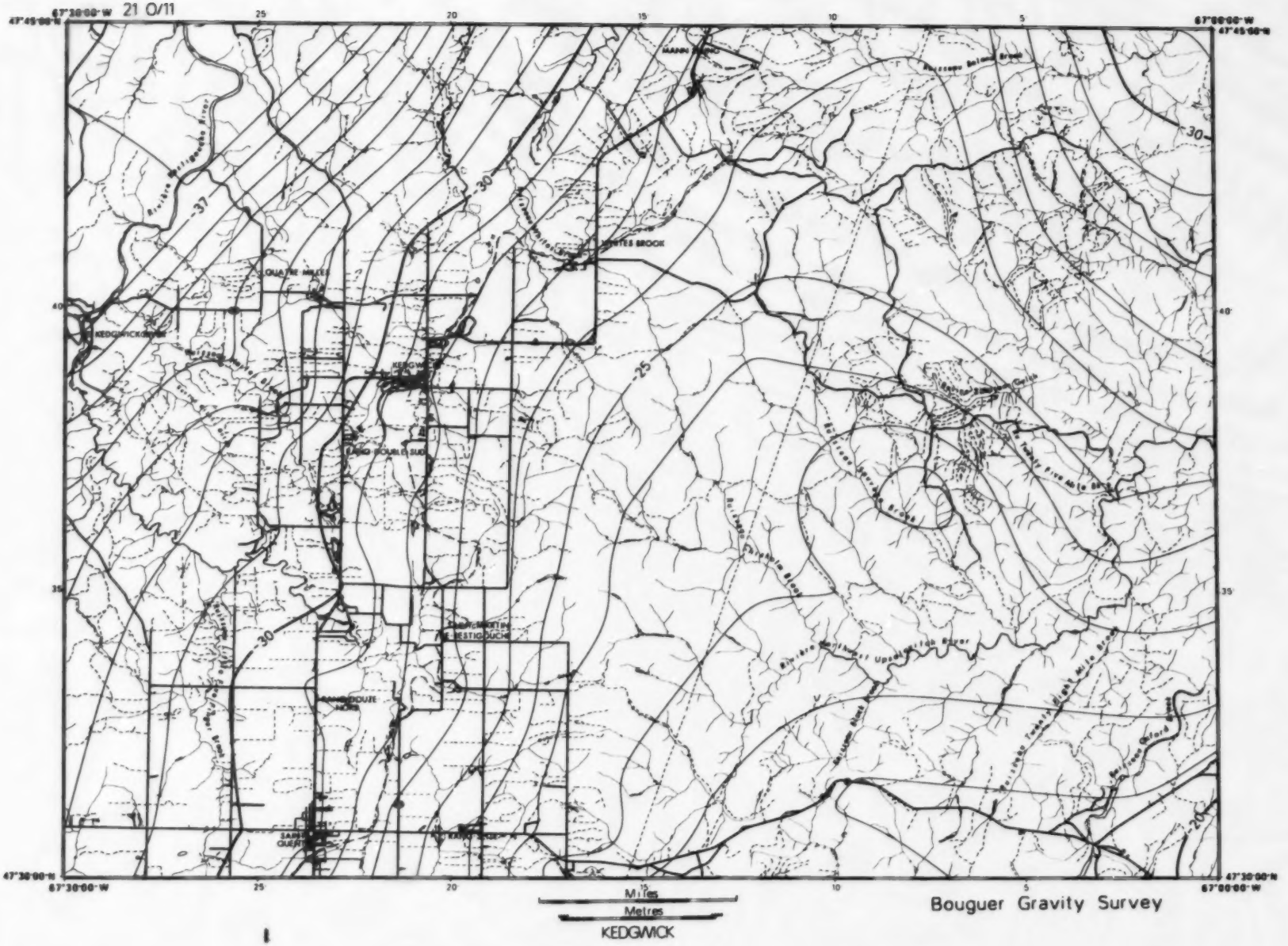

21 O/08
66°30'00"W
47°30'00"N
66°00'00"W
47°15'00"N
Miles
Metres
CALIFORNIA LAKE
Freeair Gravity Survey

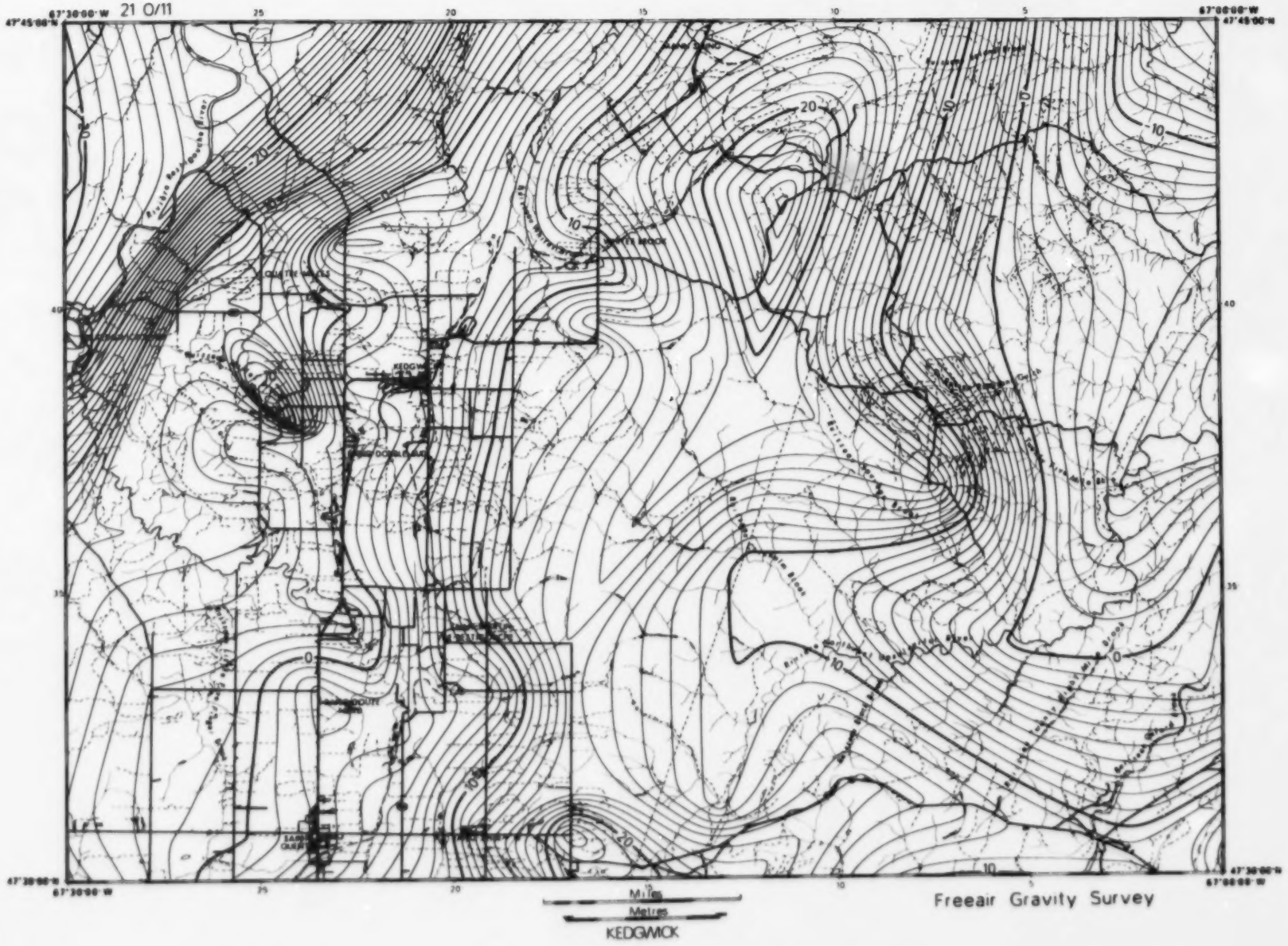

21 0/09
66°30'00"W
47°45'00"N
25'
20'
15'
10'
5'
66°00'00"W
40'
35'
47°30'00"N
-30
-20
-10
0
10
20
30
Lac/Upper Tetagouche Lake
Miles
Metres
TETAGOUCHE LAKES
Bouguer Gravity Survey

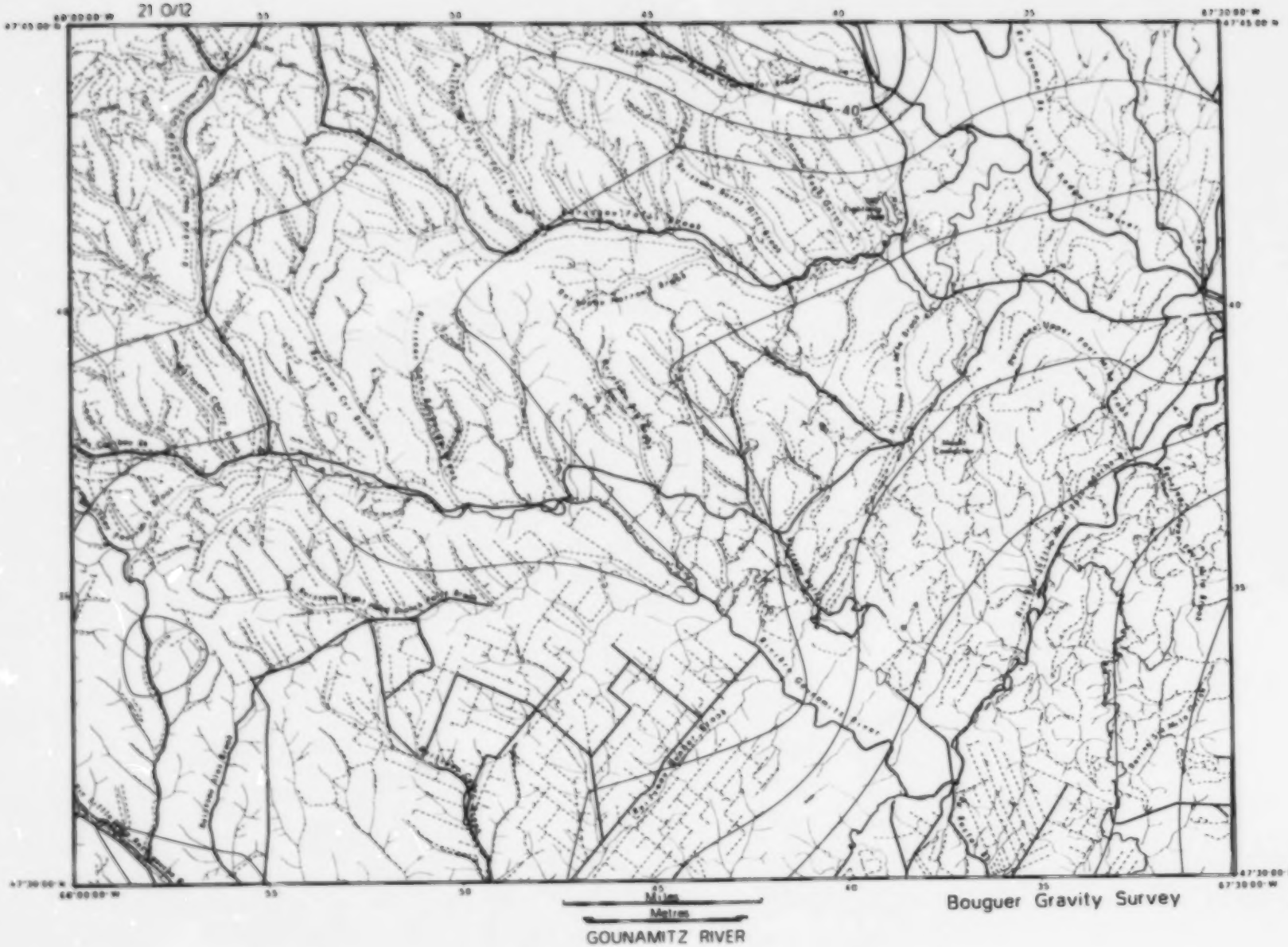

66°30'00"W
21 O/09
66°00'00"W
47°45'00"N
47°30'00"N
25
20
15
10
5
Miles
Metres
TETAGOUCHE LAKES
Freeair Gravity Survey

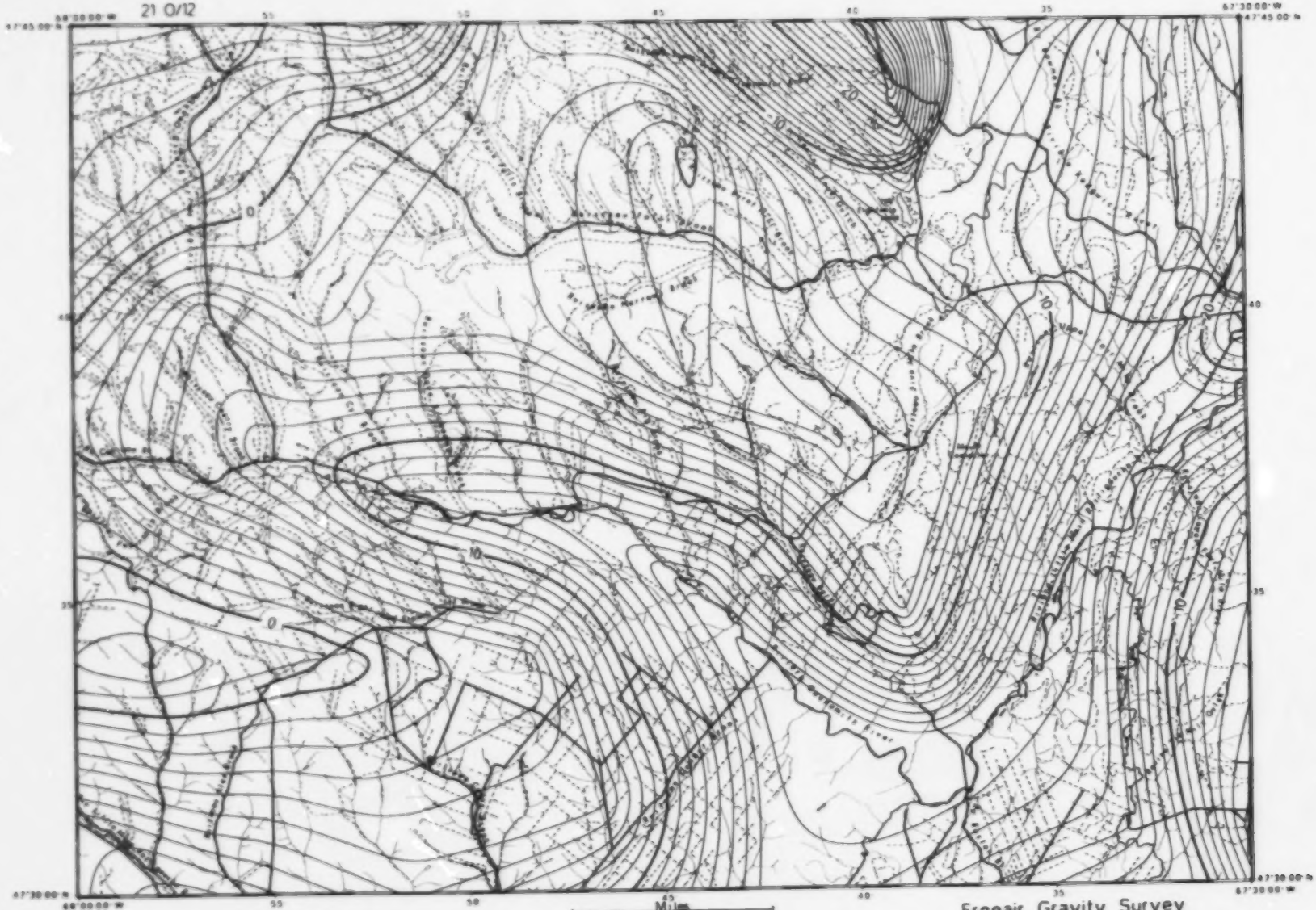

21 O/10
67°00'00"W
55
50
45
40
35
66°30'00"W
47°45'00"N
47°30'00"N
40
35
-30
-20
Bouguer Gravity Survey
Miles
Metres
UPSALQUITCH FORKS

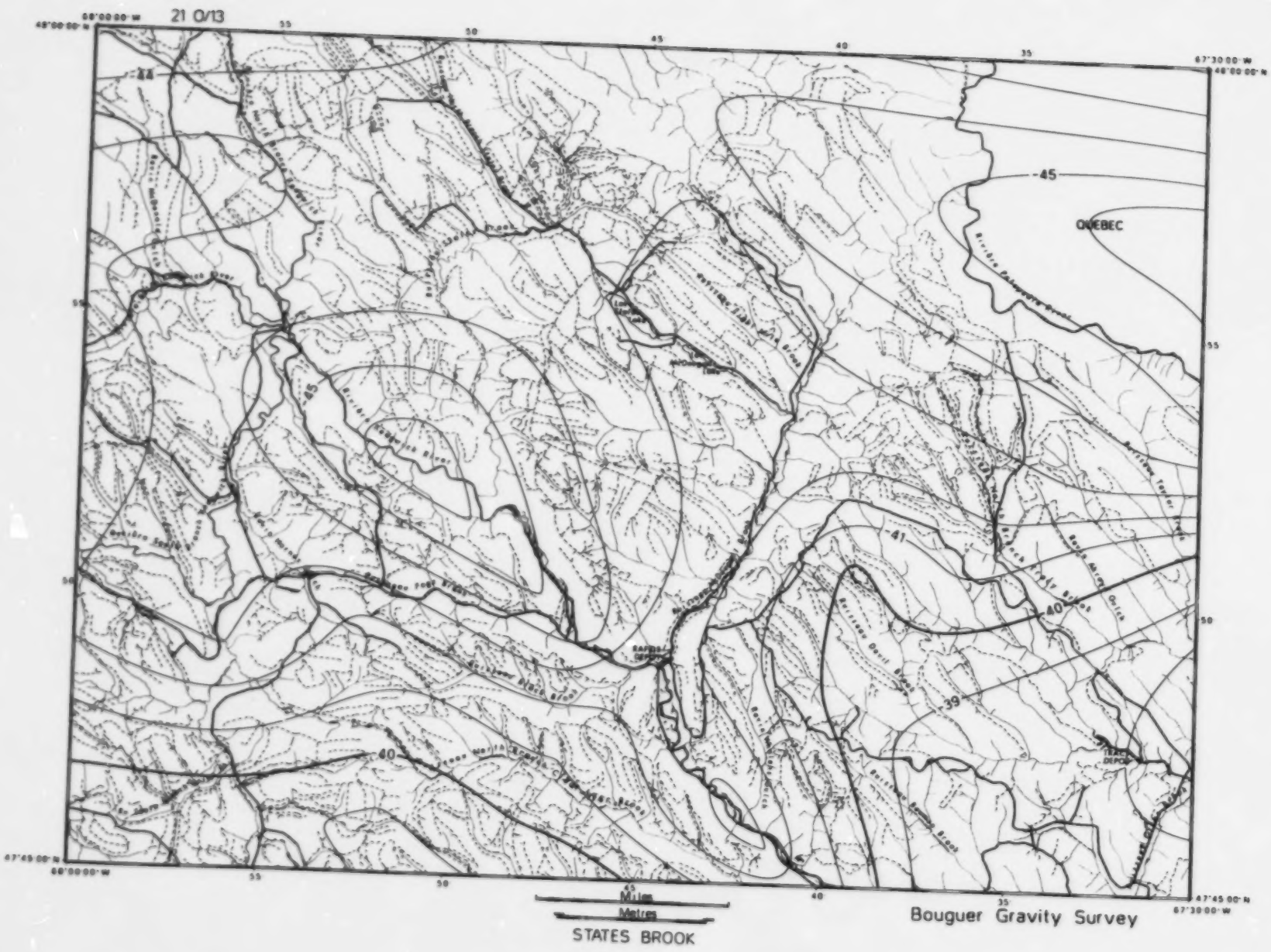

21 O/10
67°00'00"W
47°45'00"N
55'
50'
45'
40'
35'
66°30'00"W
47°30'00"N
Miles
Metres
UPSALQUITCH FORKS
Freeair Gravity Survey

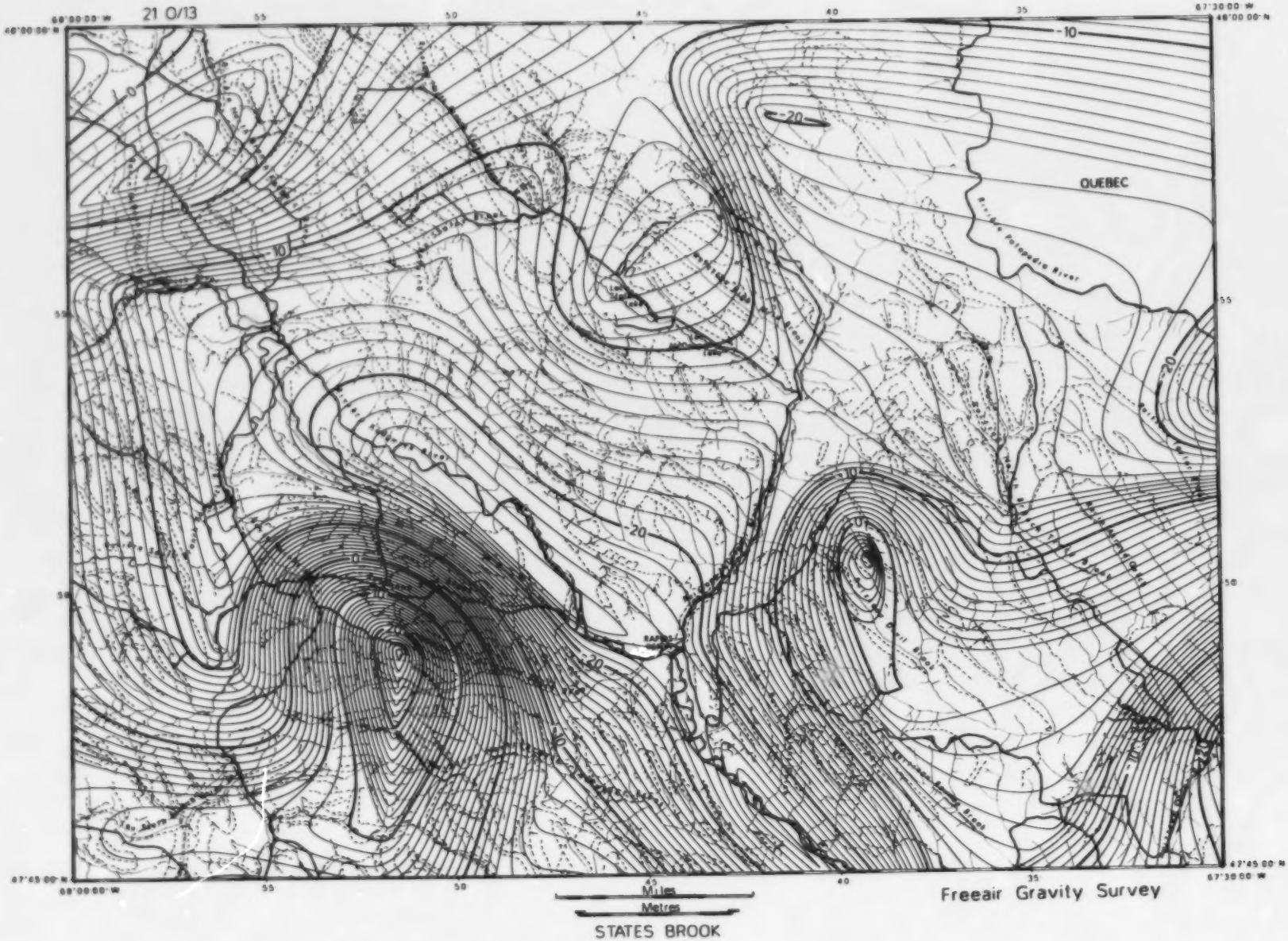

21 O/11
67°30'00"W
47°45'00"N
25
20
15
10
5
67°00'00"W
47°30'00"N
40'
35'
30
25
20
QUATRE MILES
KEDGWICK
KEDGWICK RIVER
LAKE DOUBLE SIDE
MANN BROOK
WHITES BROOK
Miles
Metres
KEDGWICK
Bouguer Gravity Survey

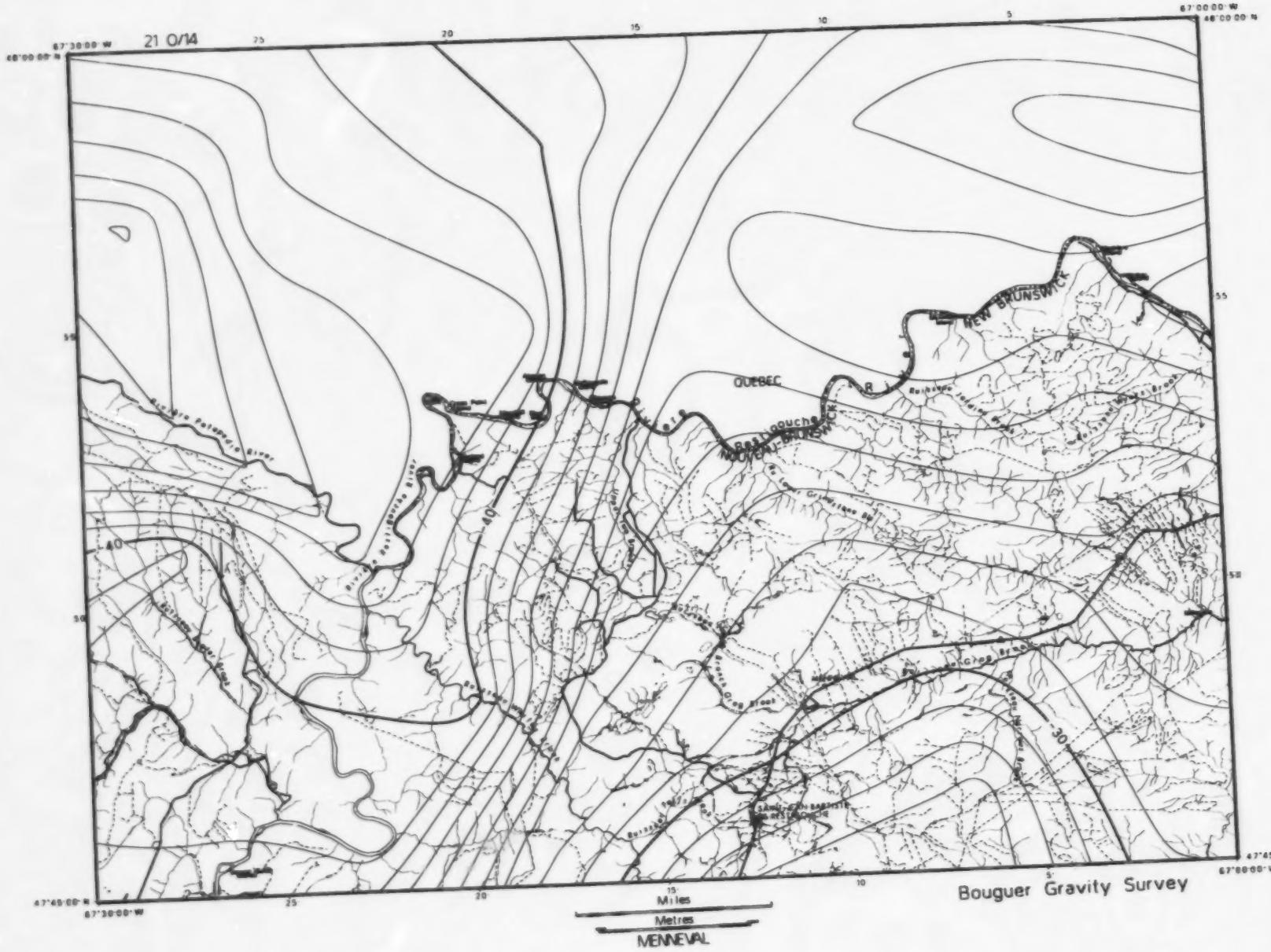

21 O/11
67°30'00"W
67°45'00"W
67°00'00"W
47°45'00"N
47°30'00"N
25
20
15
10
5
40
35
KEDGWICK
Miles
Metres
KEDGWICK
Freeair Gravity Survey


21 O/12
40
Miles
Metres
GOUNAMITZ RIVER
Bouguer Gravity Survey

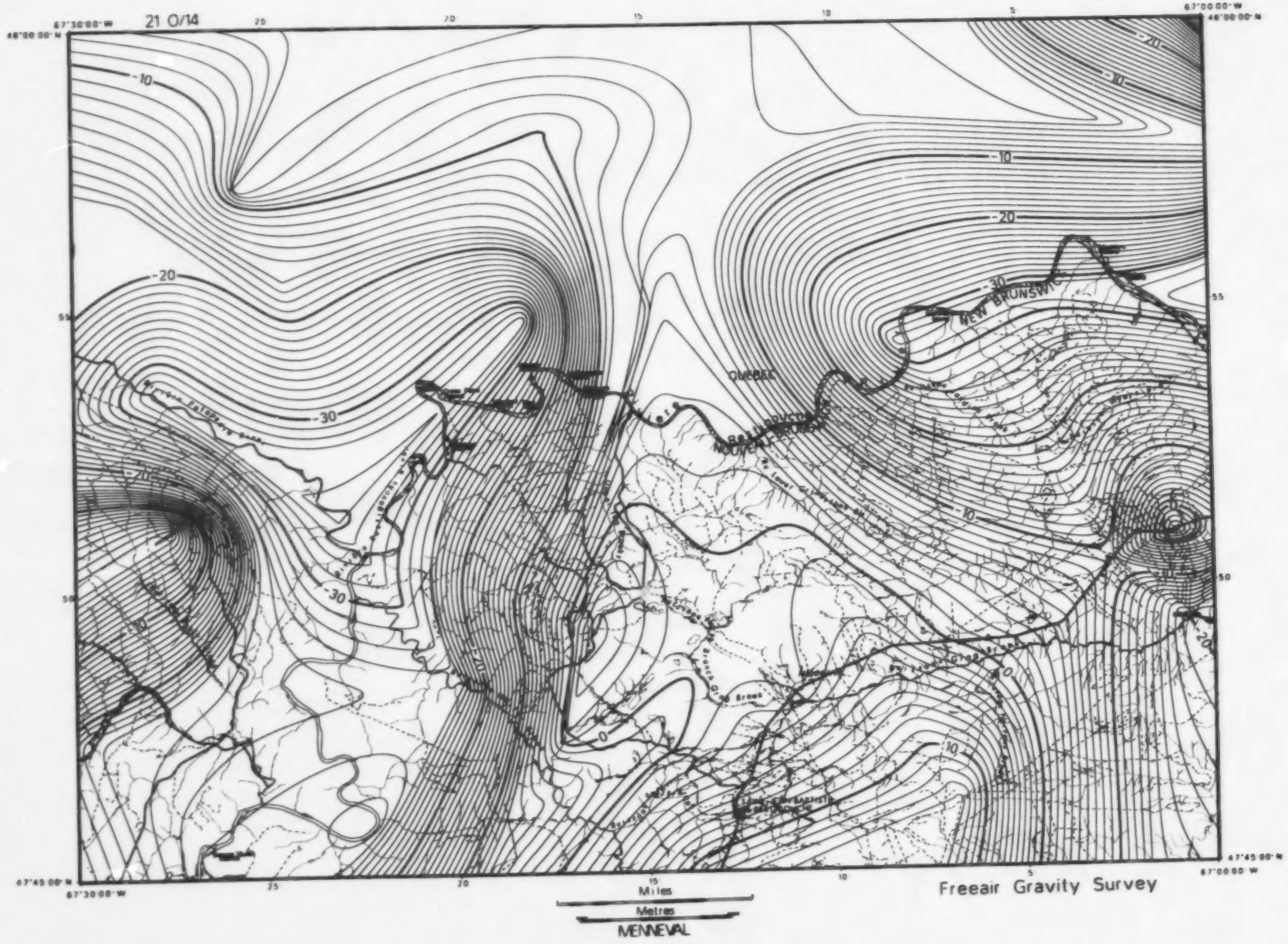

21 O/12
67°45.00'W
47°45.00'N
67°30.00'W
47°30.00'N
0
10
20
Miles
Metres
GOUNAMITZ RIVER
Freeair Gravity Survey

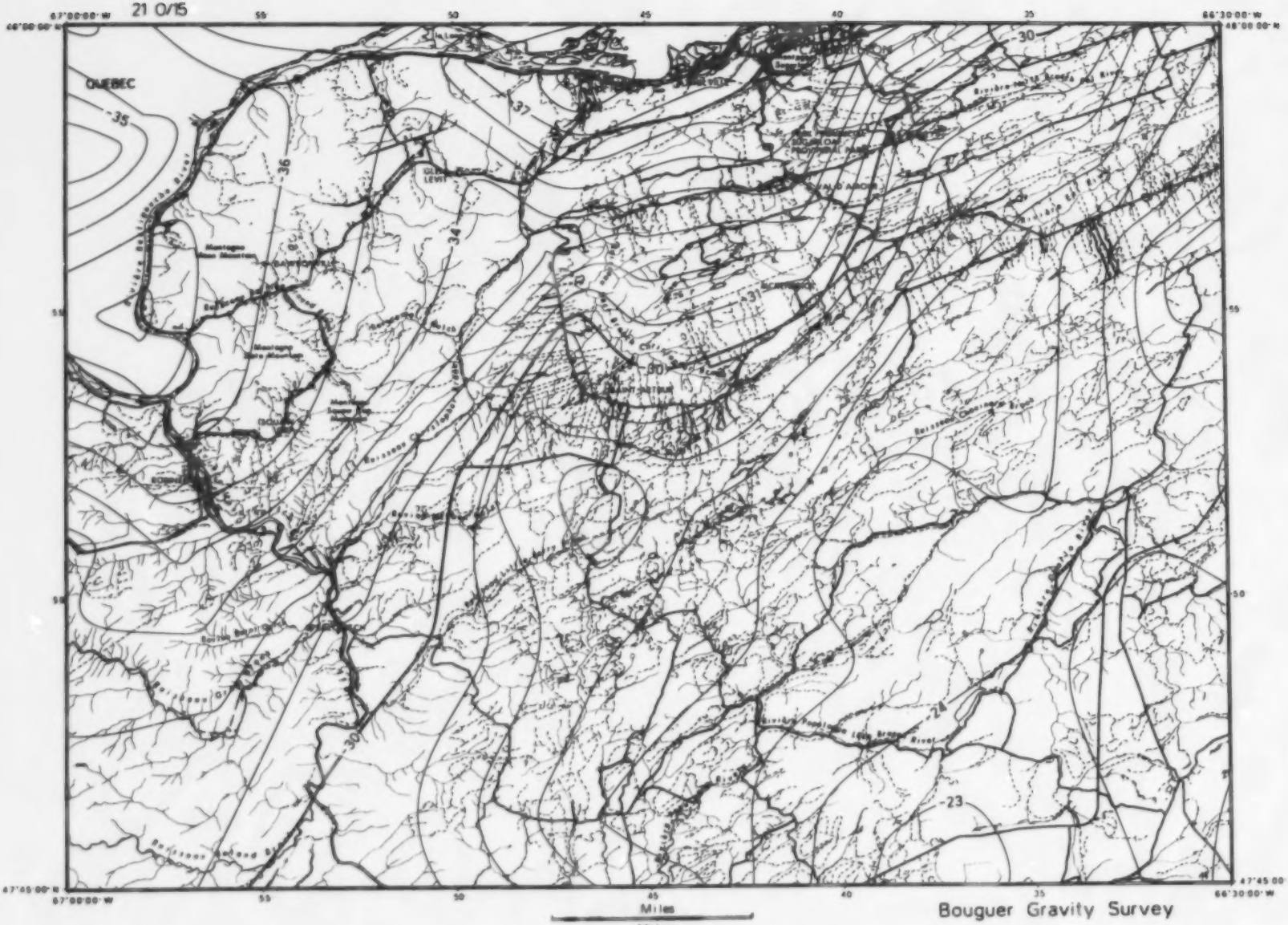

21 O/13
-44
-45
-41
-40
-39
-40
QUEBEC
45
Miles
Metres
STATES BROOK
Bouguer Gravity Survey


21 O/13
68°00'00" W
48°00'00" N
67°30'00" W
67°45'00" N
55
50
45
40
35
-10
-20
QUEBEC
Restigouche River
Patapedia River
Miles
Metres
STATES BROOK
Freeair Gravity Survey

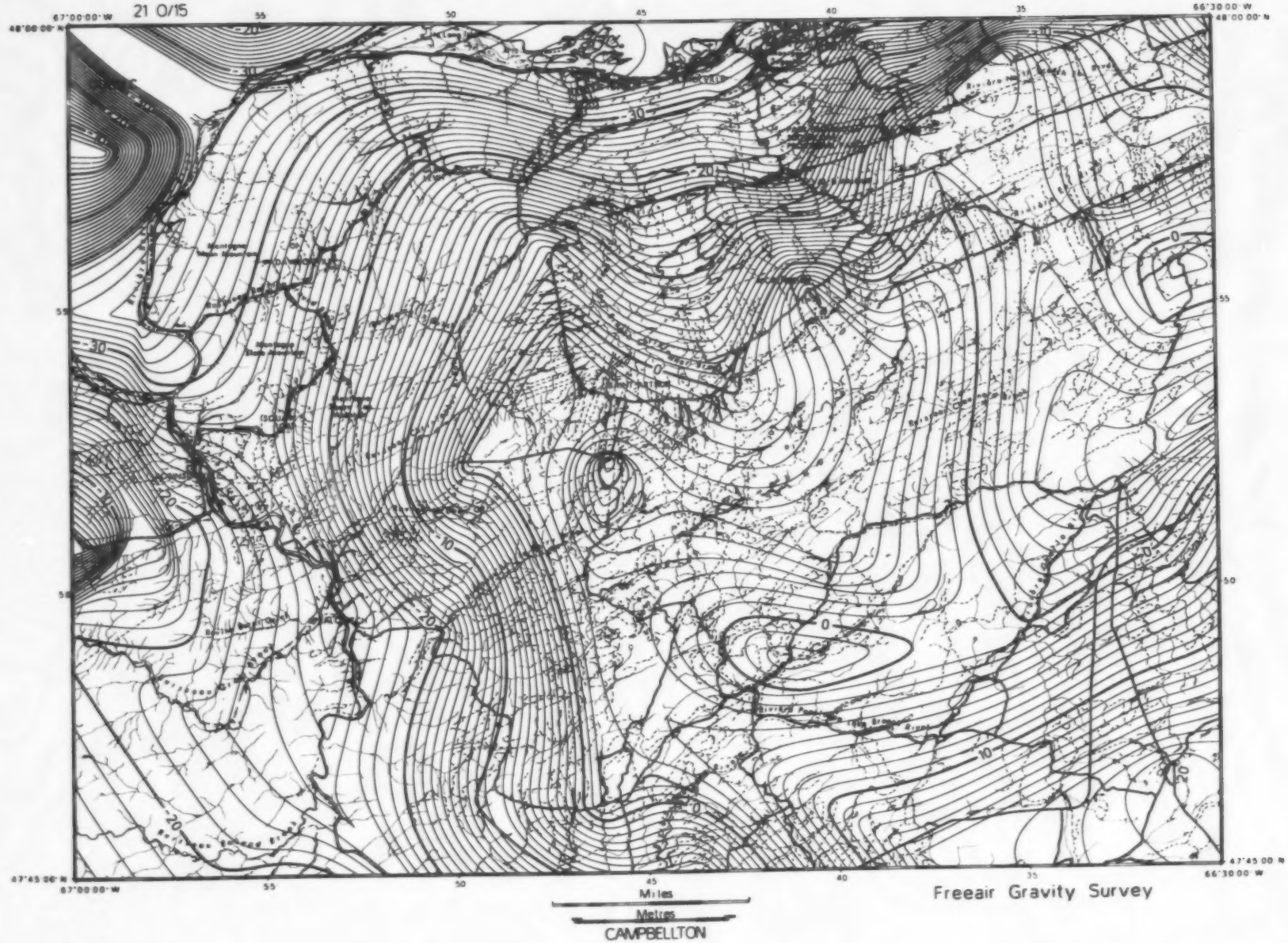


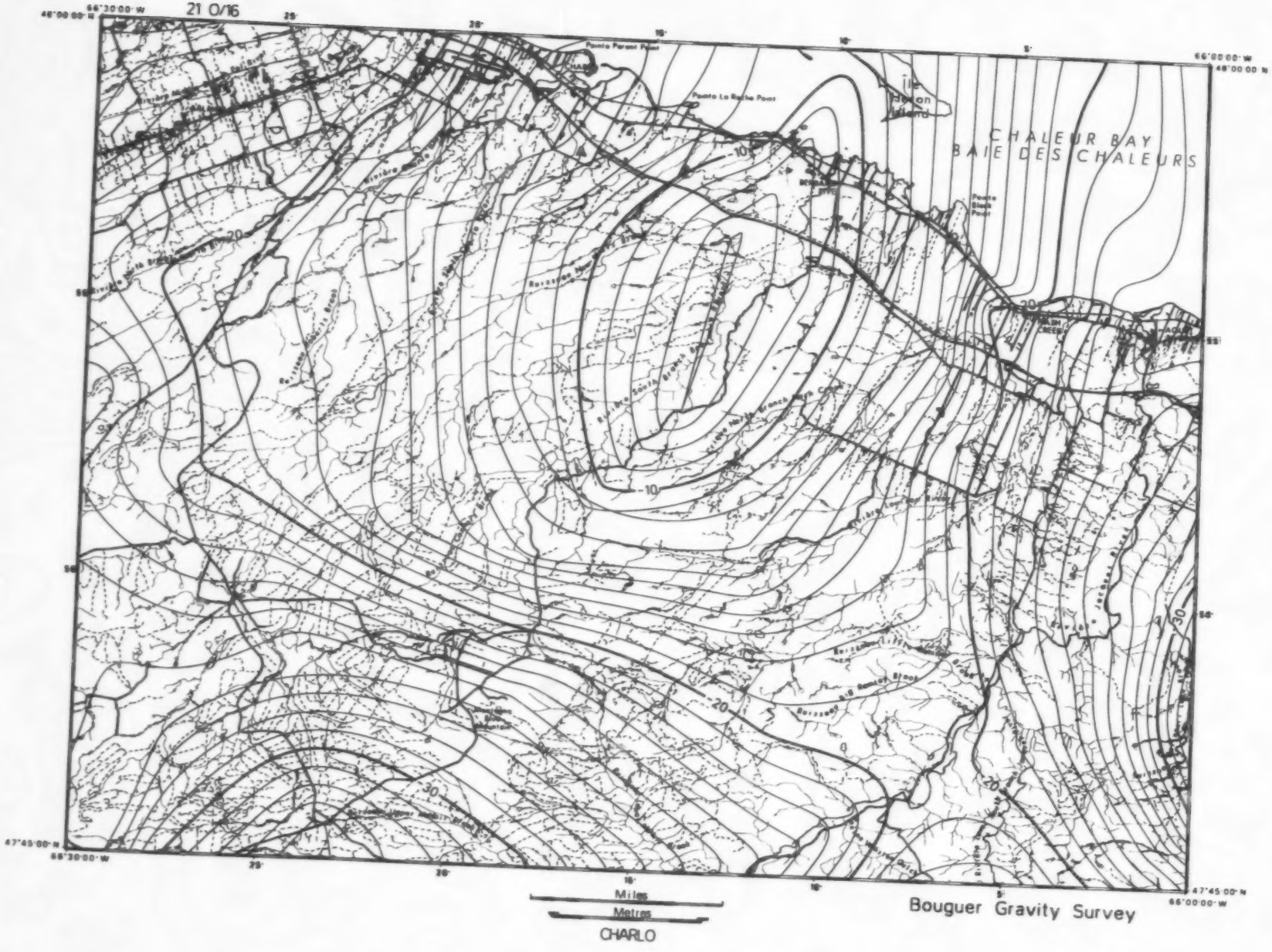
Bouguer Gravity Survey


21 O/14
67°30'00"W
48°00'00"N
67°00'00"W
47°45'00"N
NEW BRUNSWICK
QUEBEC
-10
-20
-30
0
10
20
Miles
Metres
MENNEVAL
Freeair Gravity Survey

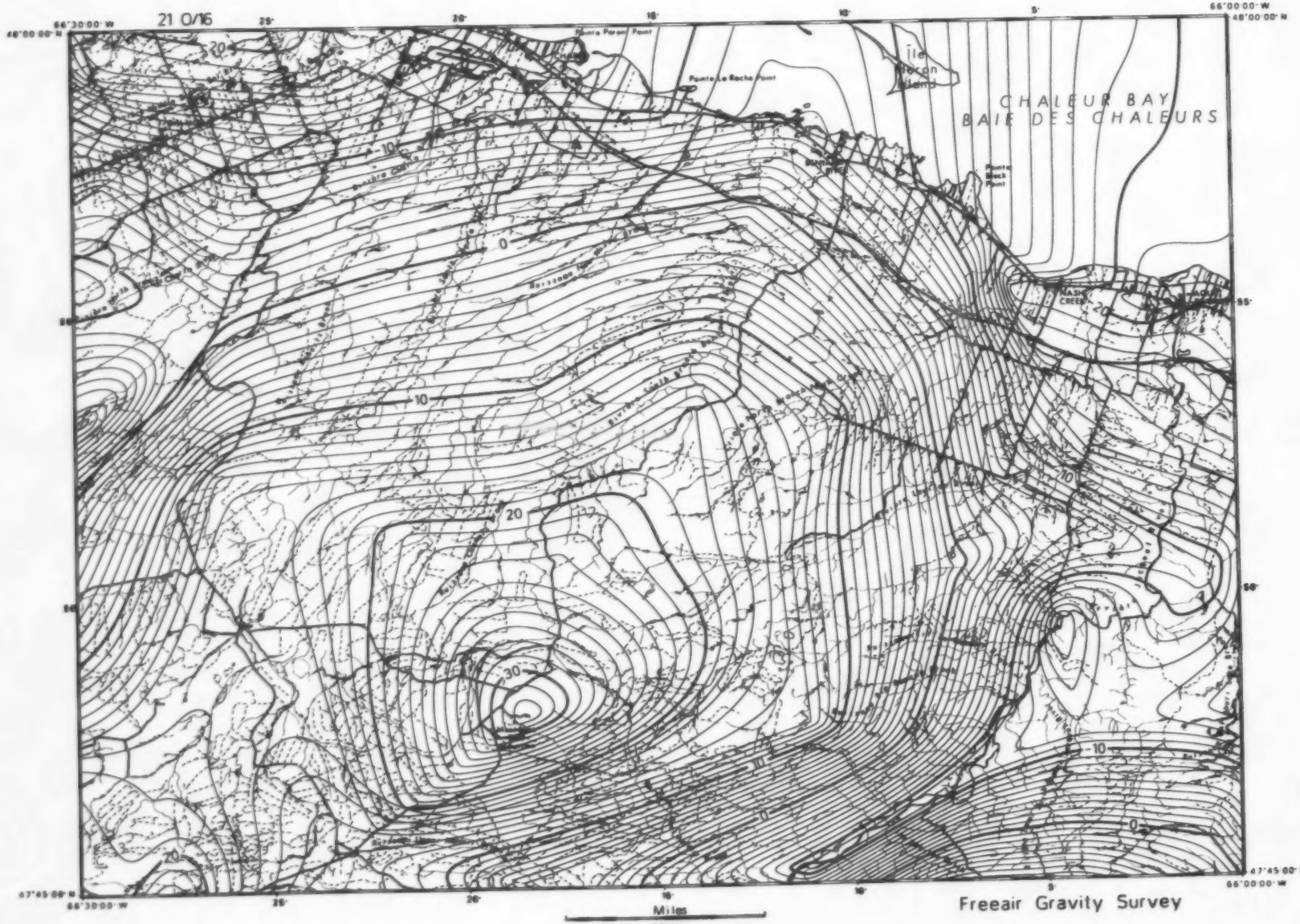


Bouguer Gravity Survey

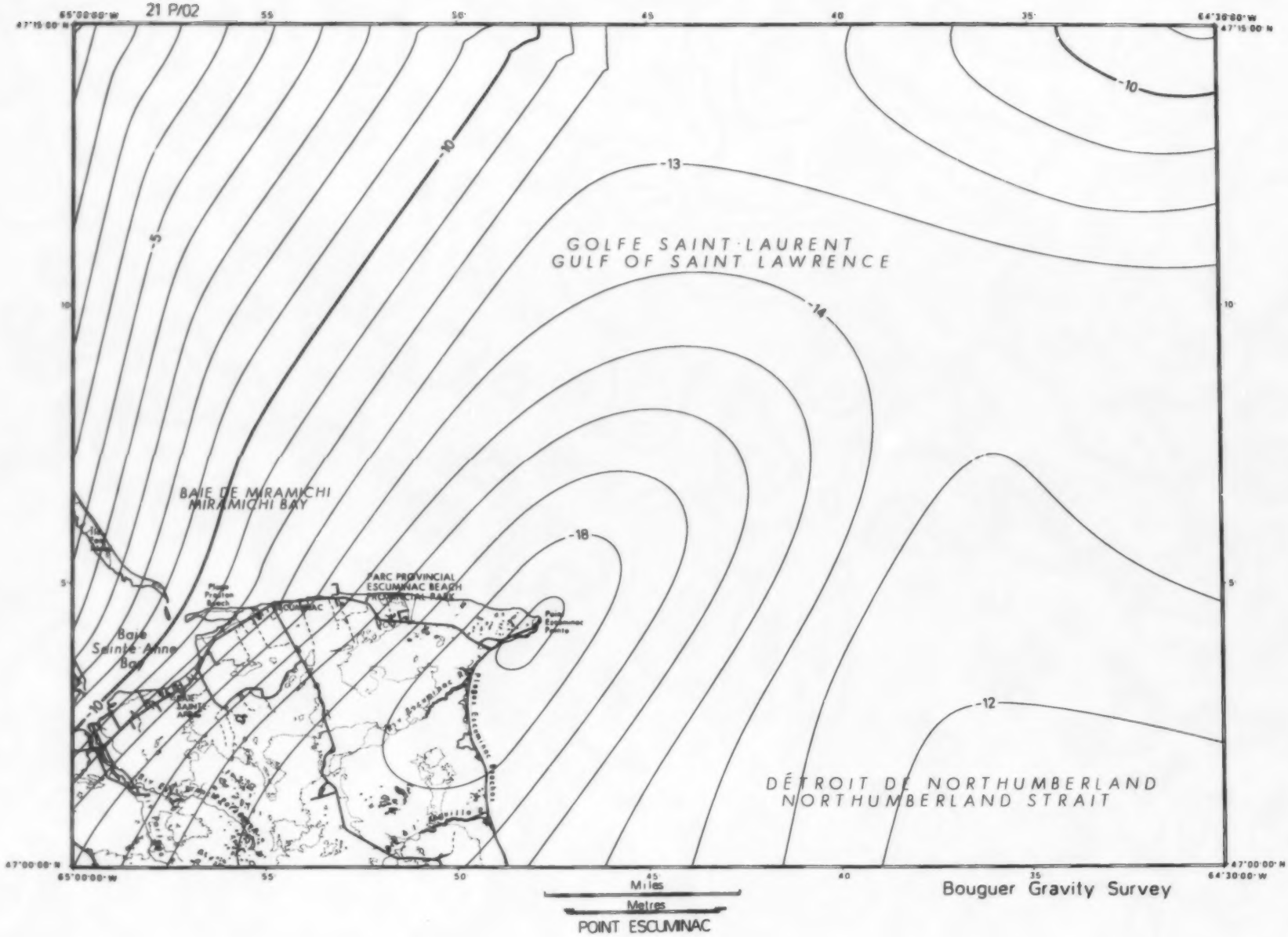

21 0/15
67°00'00" W
66°30'00" W
48°00'00" N
47°45'00" N
55
50
45
40
35
-30
-20
-10
0
10
20
Miles
Metres
CAMPBELLTON
Freeair Gravity Survey

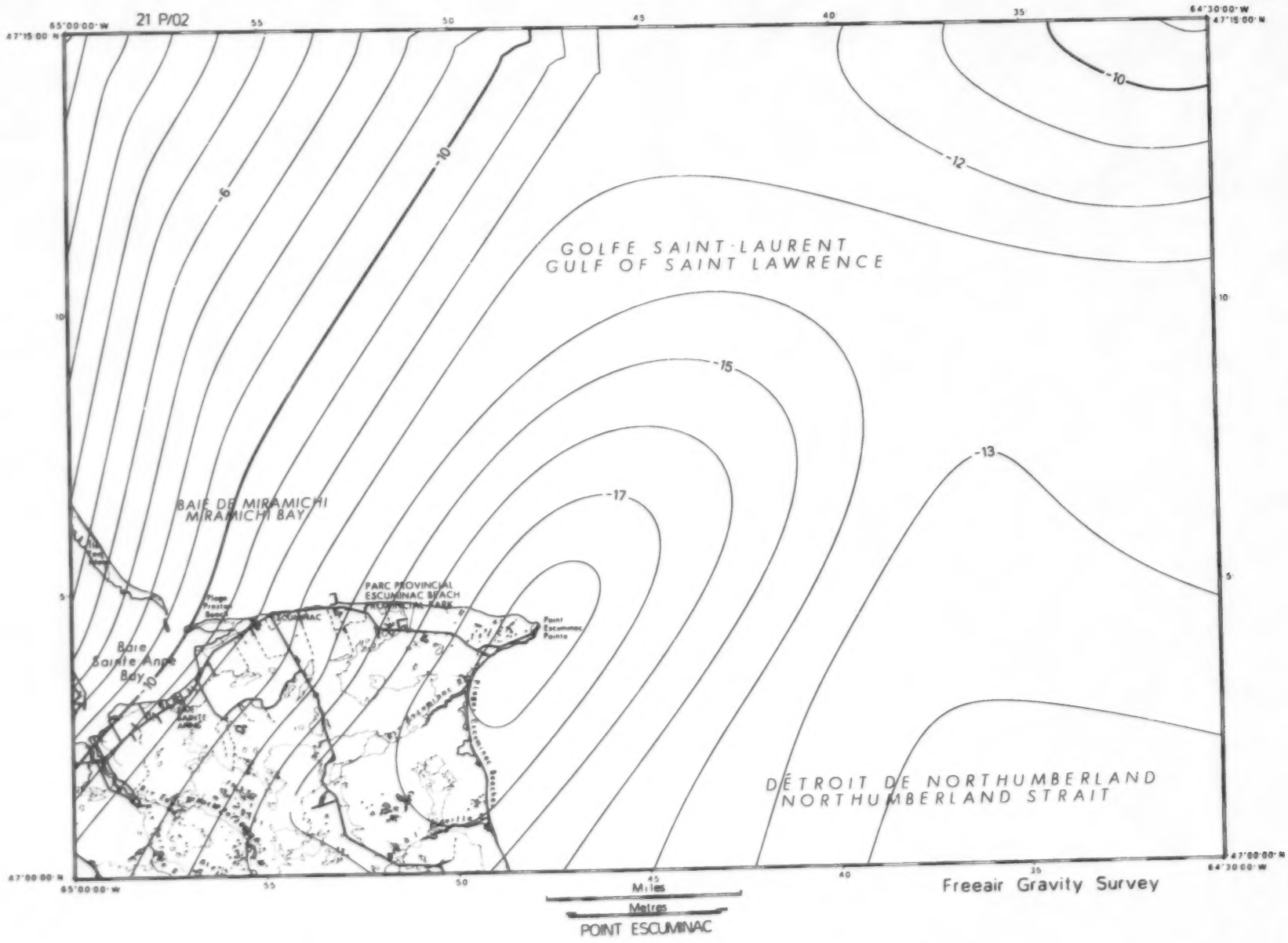


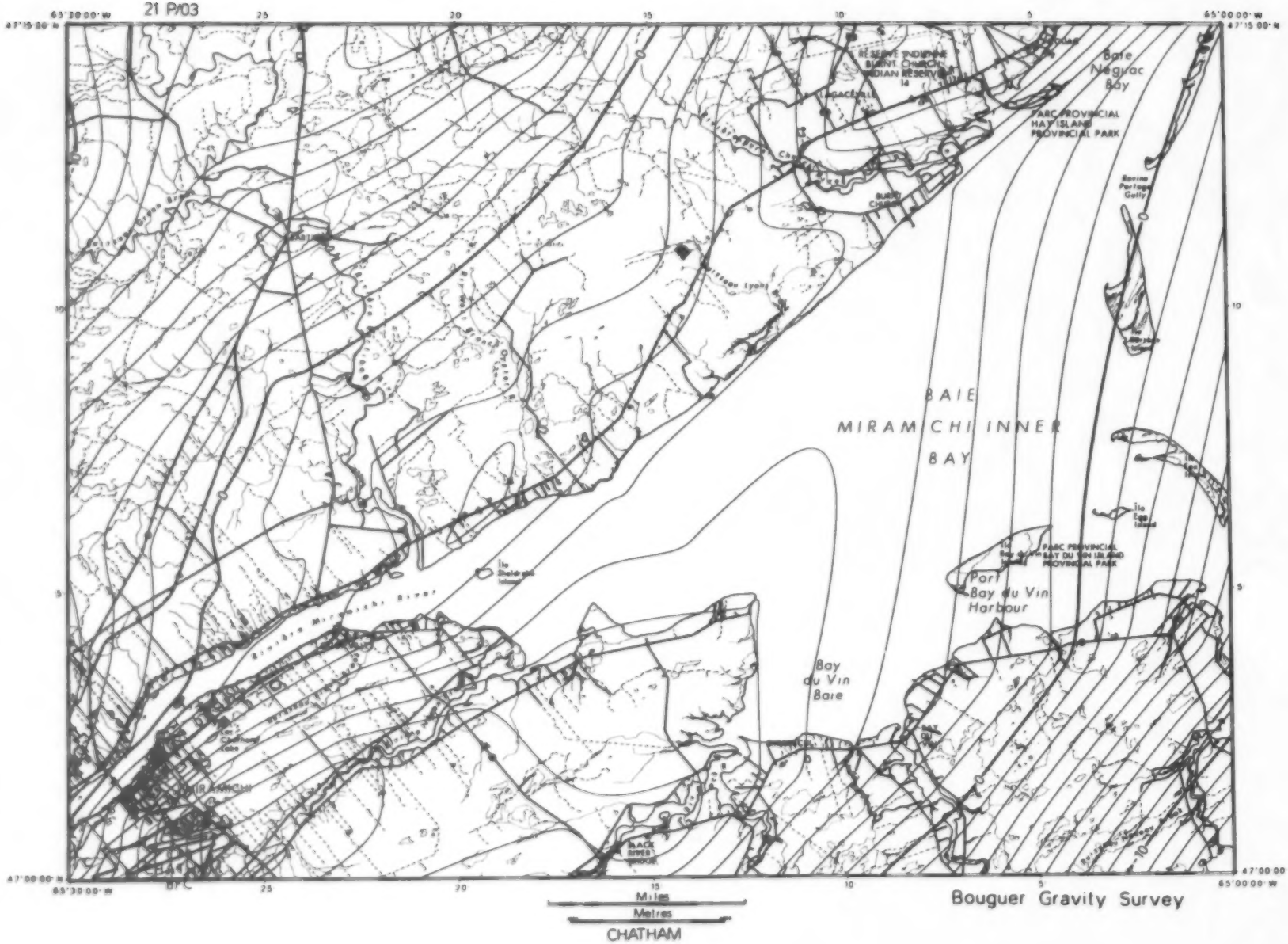
Bouguer Gravity Survey

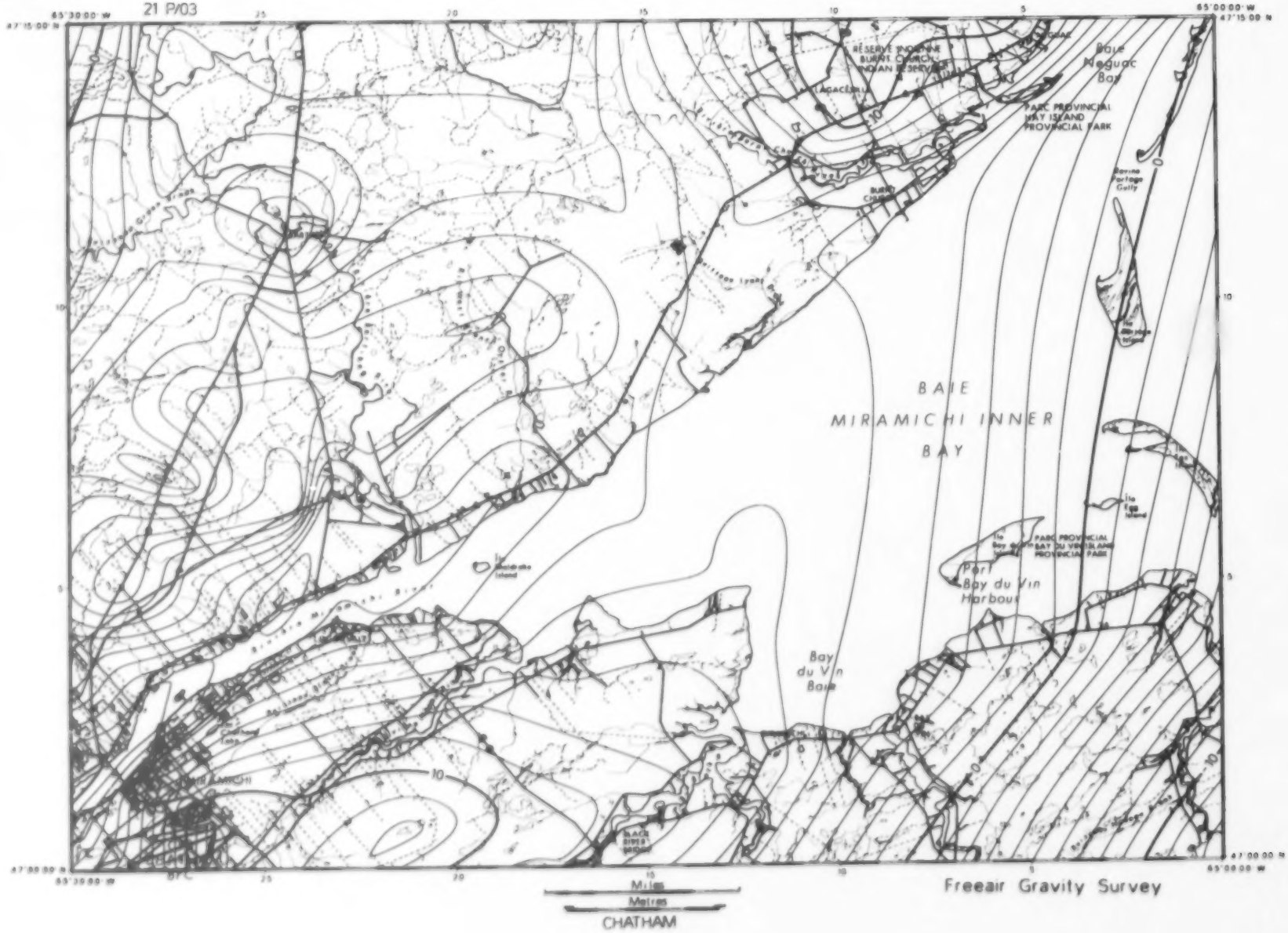


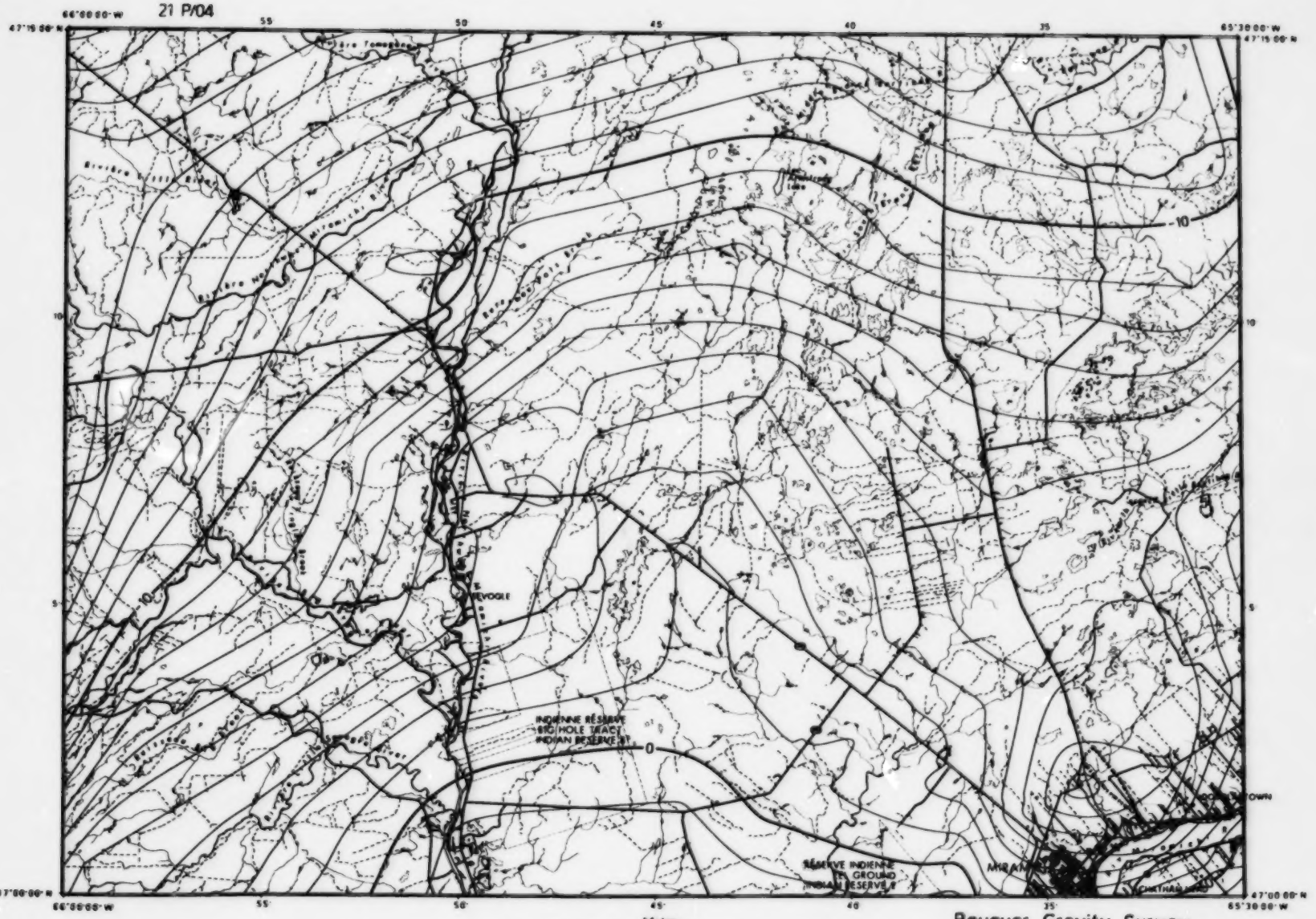
Freeair Gravity Survey

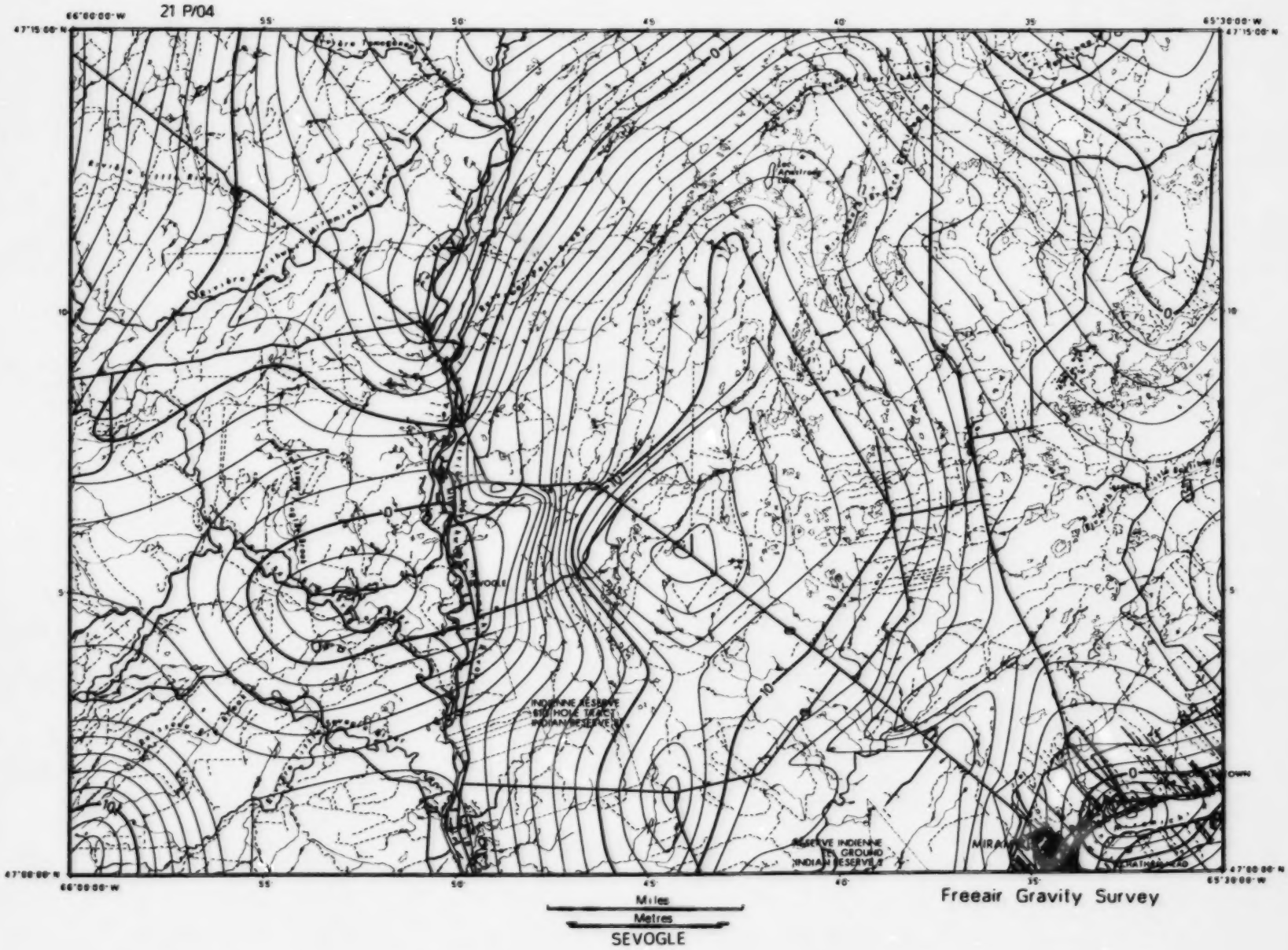

21 P/02
65°00'00"W
64°30'00"W
47°15'00"N
47°00'00"N
55
50
45
40
35
-10
-13
-14
-18
-12
GOLFE SAINT-LAURENT
GULF OF SAINT LAWRENCE
BAIE DE MIRAMICHI
MIRAMICHI BAY
PARC PROVINCIAL
ESCUMINAC BEACH
PROVINCIAL PARK
Baie
Sainte Anne
Bay
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
Miles
Metres
POINT ESCUMINAC
Bouguer Gravity Survey

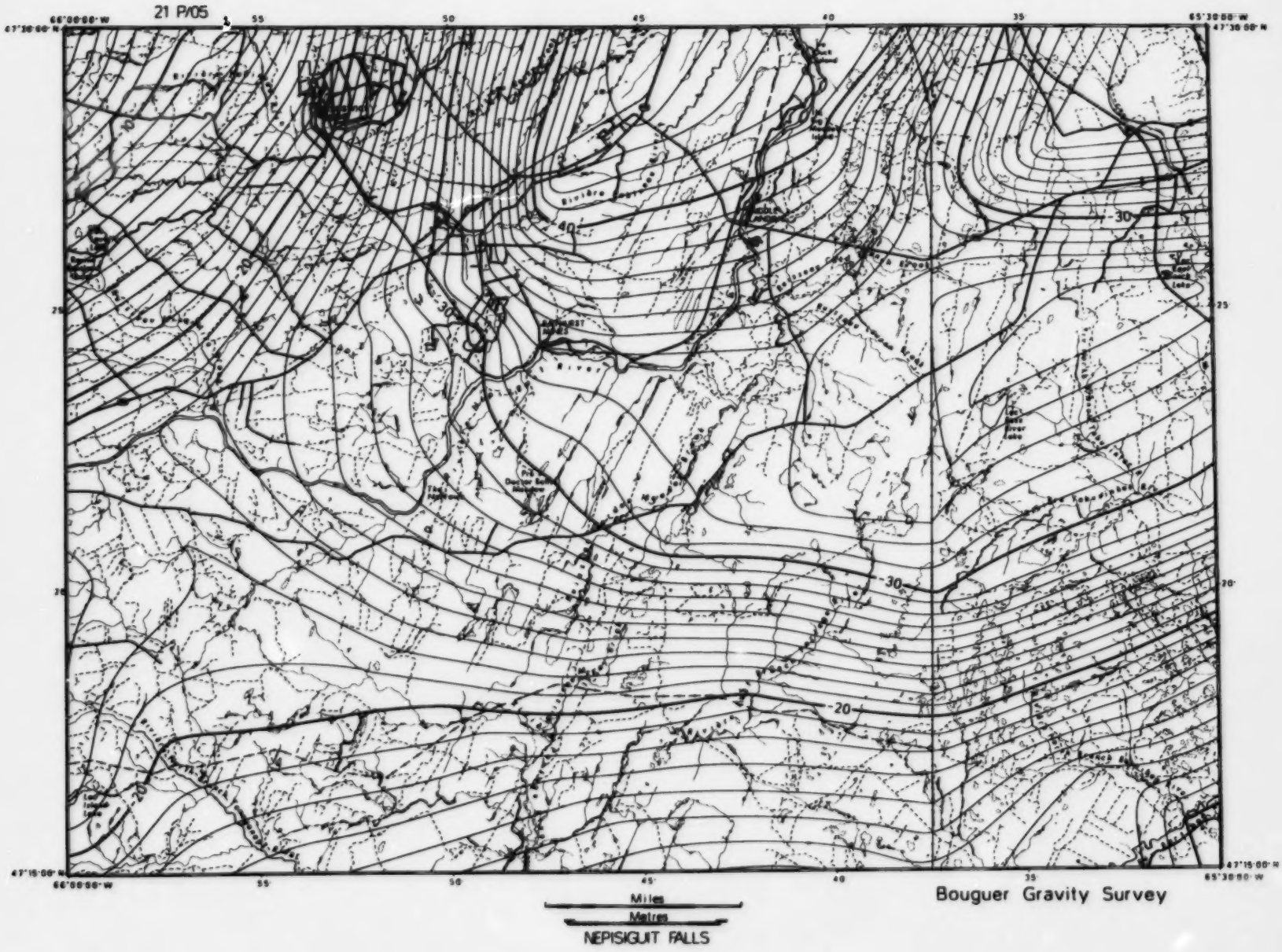

21 P/02
65°00'00" W
64°30'00" W
47°15'00" N
47°00'00" N
-6
-10
-12
-15
-17
-13
GOLFE SAINT-LAURENT
GULF OF SAINT LAWRENCE
BAIE DE MIRAMICHI
MIRAMICHI BAY
PARC PROVINCIAL
ESCUMINAC BEACH
PROVINCIAL PARK
Point Escuminac
Pointe
Baie
Sainte Anne
Bay
DÉTROIT DE NORTHUMBERLAND
NORTHUMBERLAND STRAIT
Miles
Metres
POINT ESCUMINAC
Freeair Gravity Survey


21 P/03
65°30'00" W
47°15'00" N
65°00'00" W
47°00'00" N
BAIE
MIRAMICHI INNER
BAY
Baie
Negrac
Bay
PARC PROVINCIAL
HAY ISLAND
PROVINCIAL PARK
Port
Bay du Vin
Harbour
Bay
du Vin
Baie
PARC PROVINCIAL
BAY DU VIN ISLAND
PROVINCIAL PARK
CHATHAM
Miles
Metres
Bouguer Gravity Survey

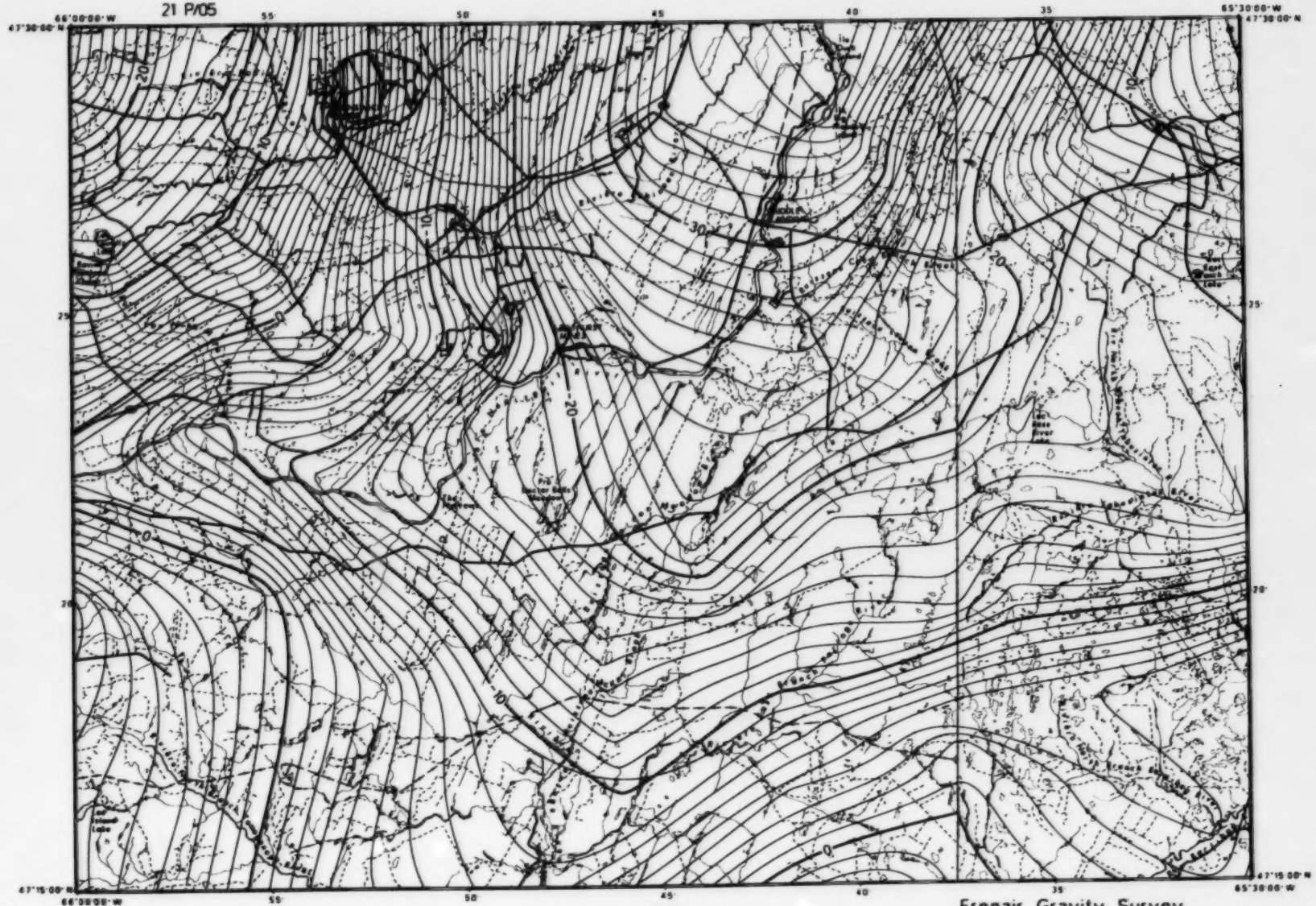

21 P/03
65°30'00" W
65°00'00" W
47°15'00" N
47°00'00" N
BAIE
MIRAMICHI INNER
BAY
Bay
du Vin
Baie
Bay du Vin
Harbour
Baie
Neguac
Bay
PARC PROVINCIAL
MAY ISLAND
PROVINCIAL PARK
Miles
Metres
CHATHAM
Freeair Gravity Survey

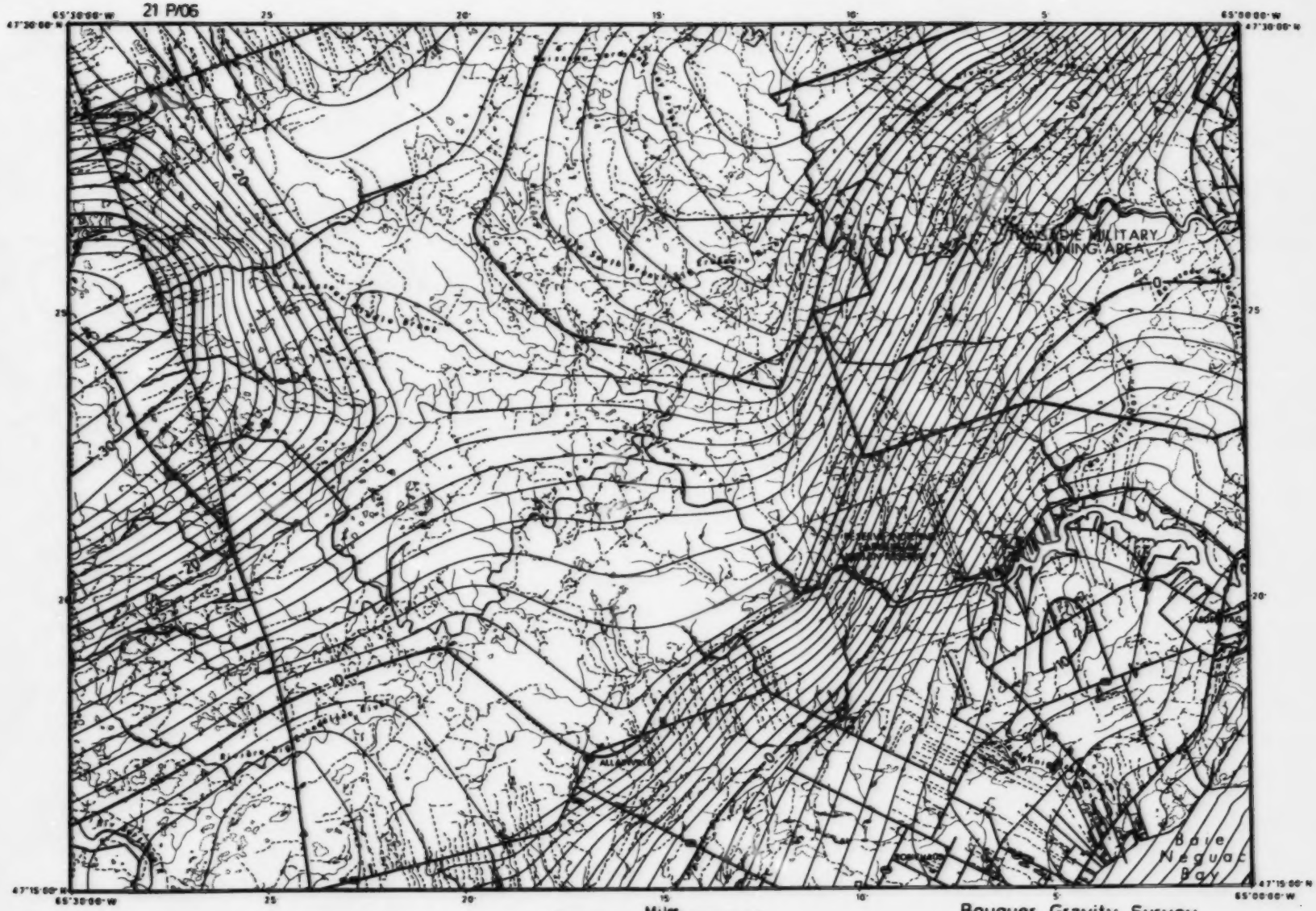

21 P/04
47°15'00"N
47°00'00"N
66°00'00"W
65°30'00"W
55'
50'
45'
40'
35'
10
5
0
-10
SEVOGLE
INDIENNE RÉSERVE
BIG HOLE TRACT
INDIAN RESERVE
RÉSERVE INDIENNE
TP. GROUND
INDIAN RESERVE
MIRAMICHI
CHATHAM
Miles
Metres
SEVOGLE
Bouguer Gravity Survey


21 P/04
66°00'00"W
65°30'00"W
47°15'00"N
47°00'00"N
55'
50'
45'
40'
35'
10
5
0
-10
SEVOGLE
INDIENNE RESERVE
BIG HOLE TRACT
INDIAN RESERVE
RESERVE INDIENNE
BIG GROUND
INDIAN RESERVE
MIRAMICHI
Miles
Metres
SEVOGLE
Freeair Gravity Survey

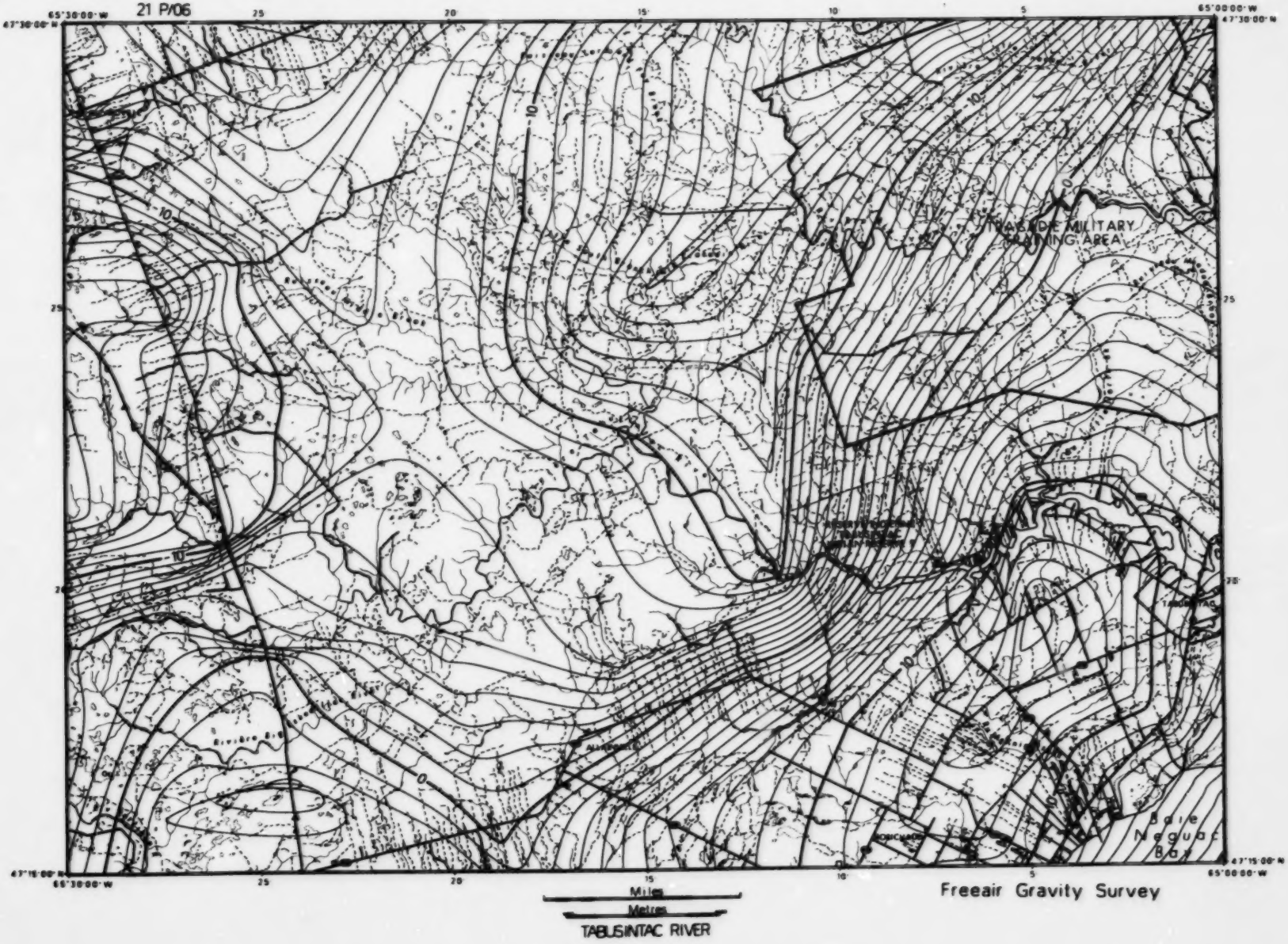


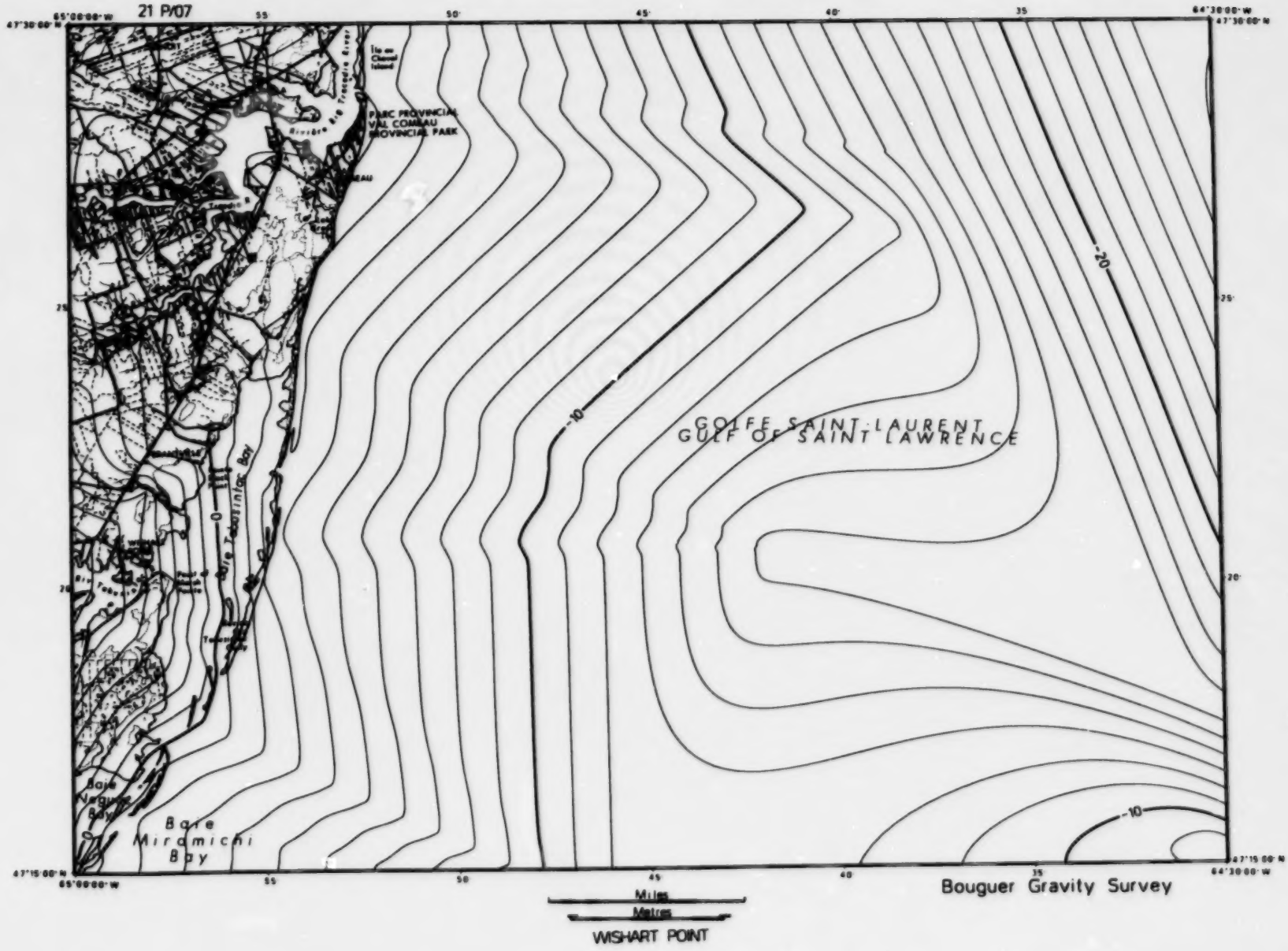
Bouguer Gravity Survey

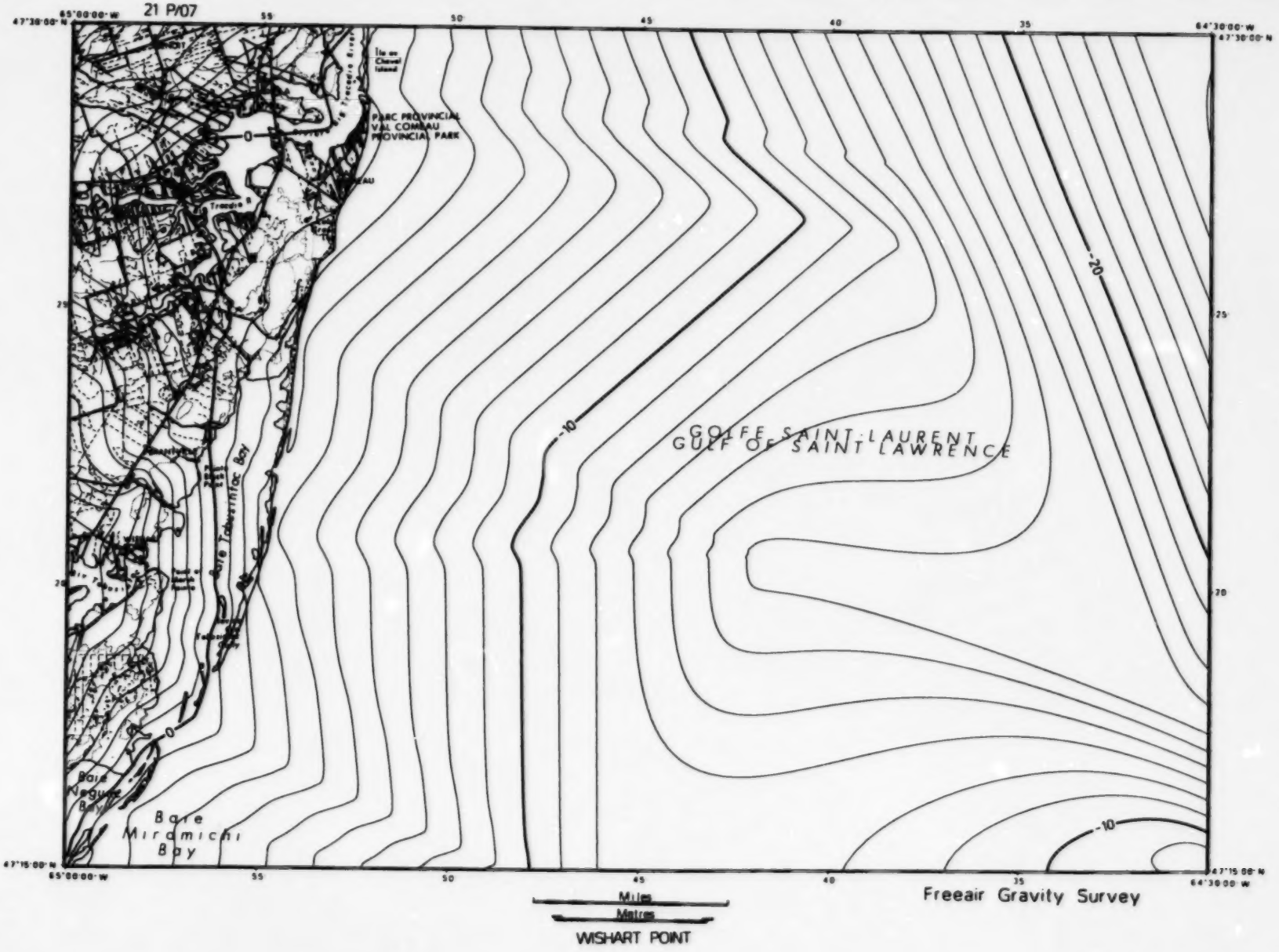

21 P/05
66°00'00" W
65°30'00" W
47°30'00" N
47°15'00" N
55'
50'
45'
40'
35'
25'
20'
Miles
Metres
NEPISIGUIT FALLS
Freeair Gravity Survey

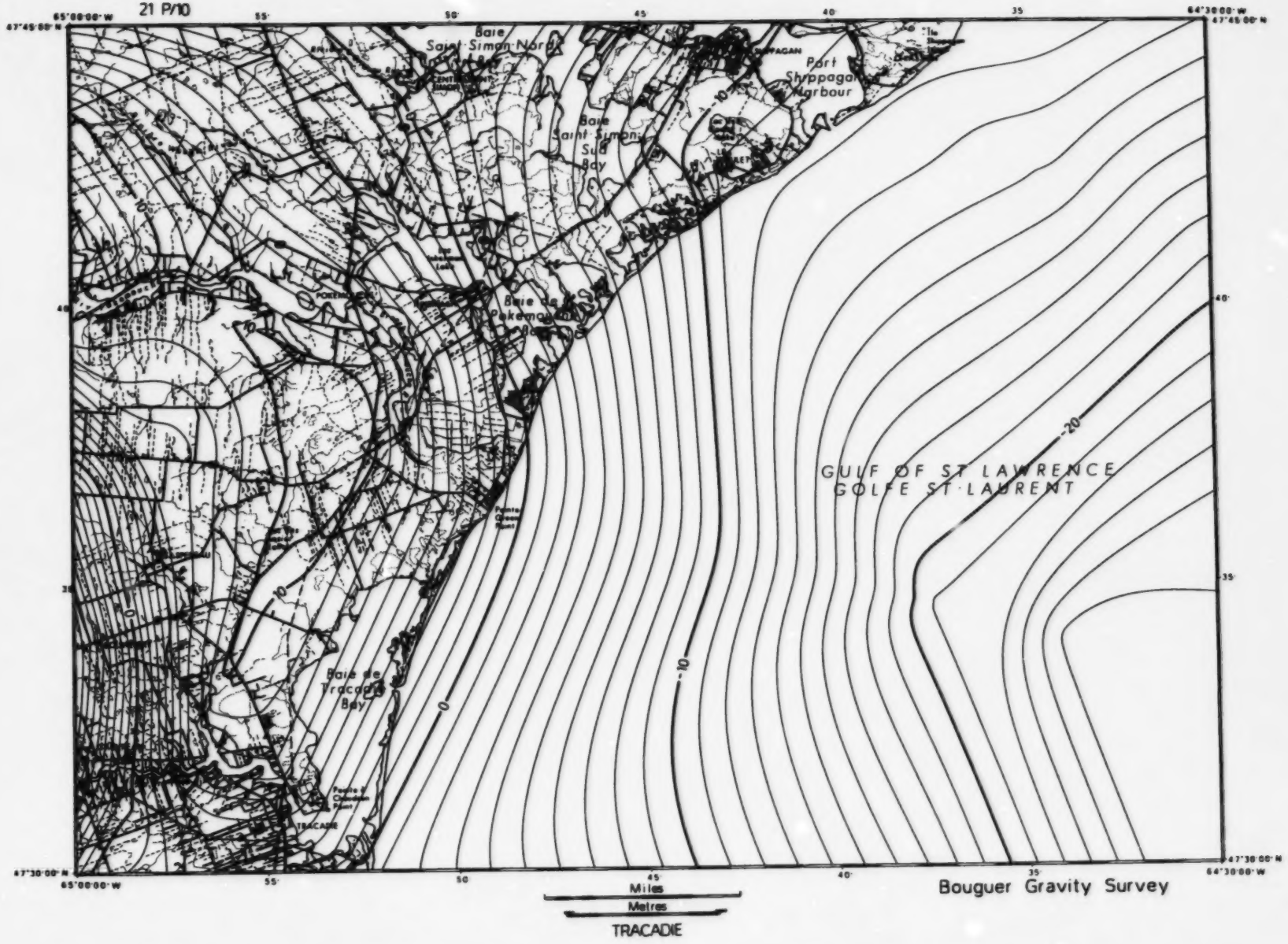


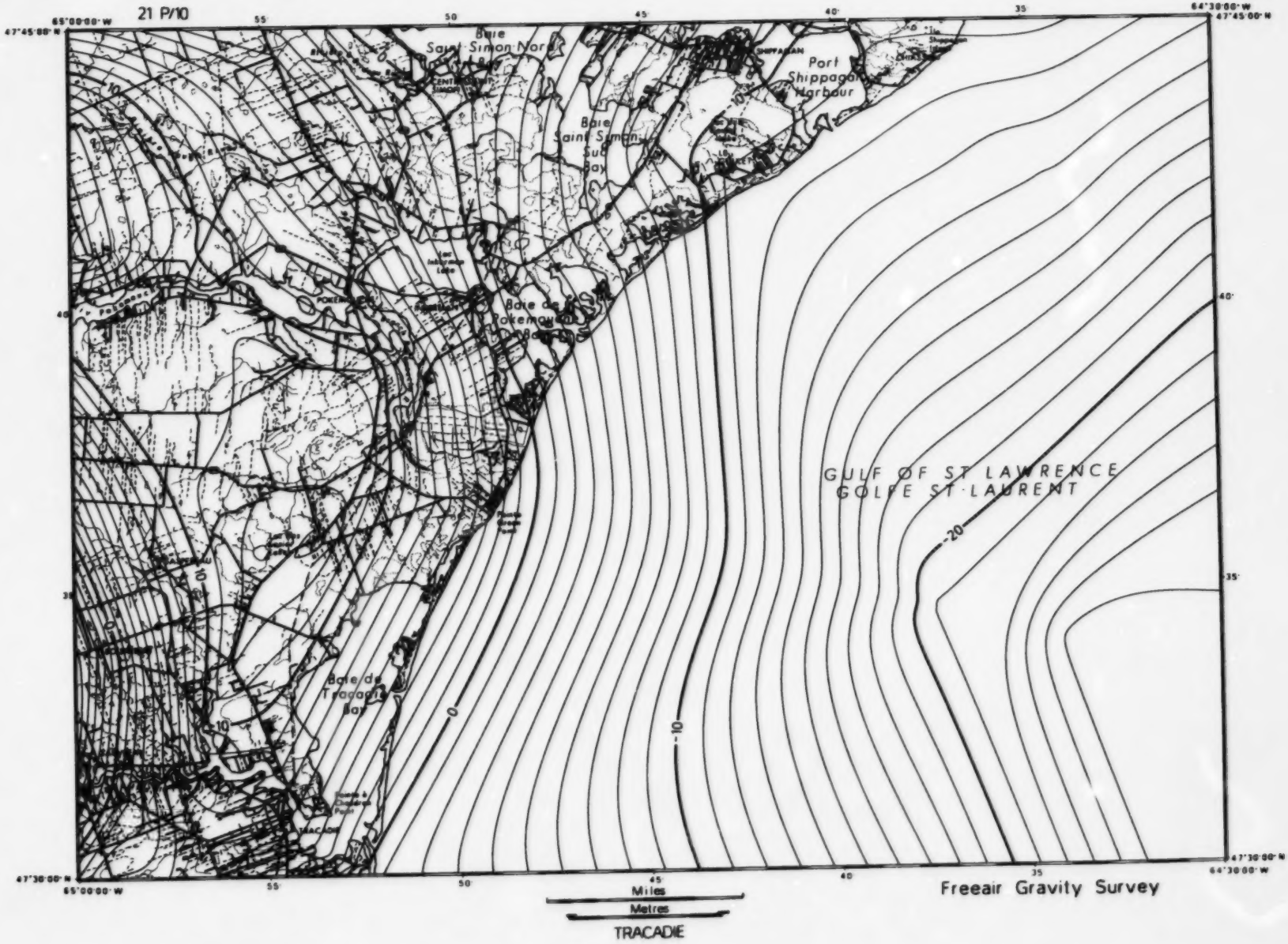
Bouguer Gravity Survey

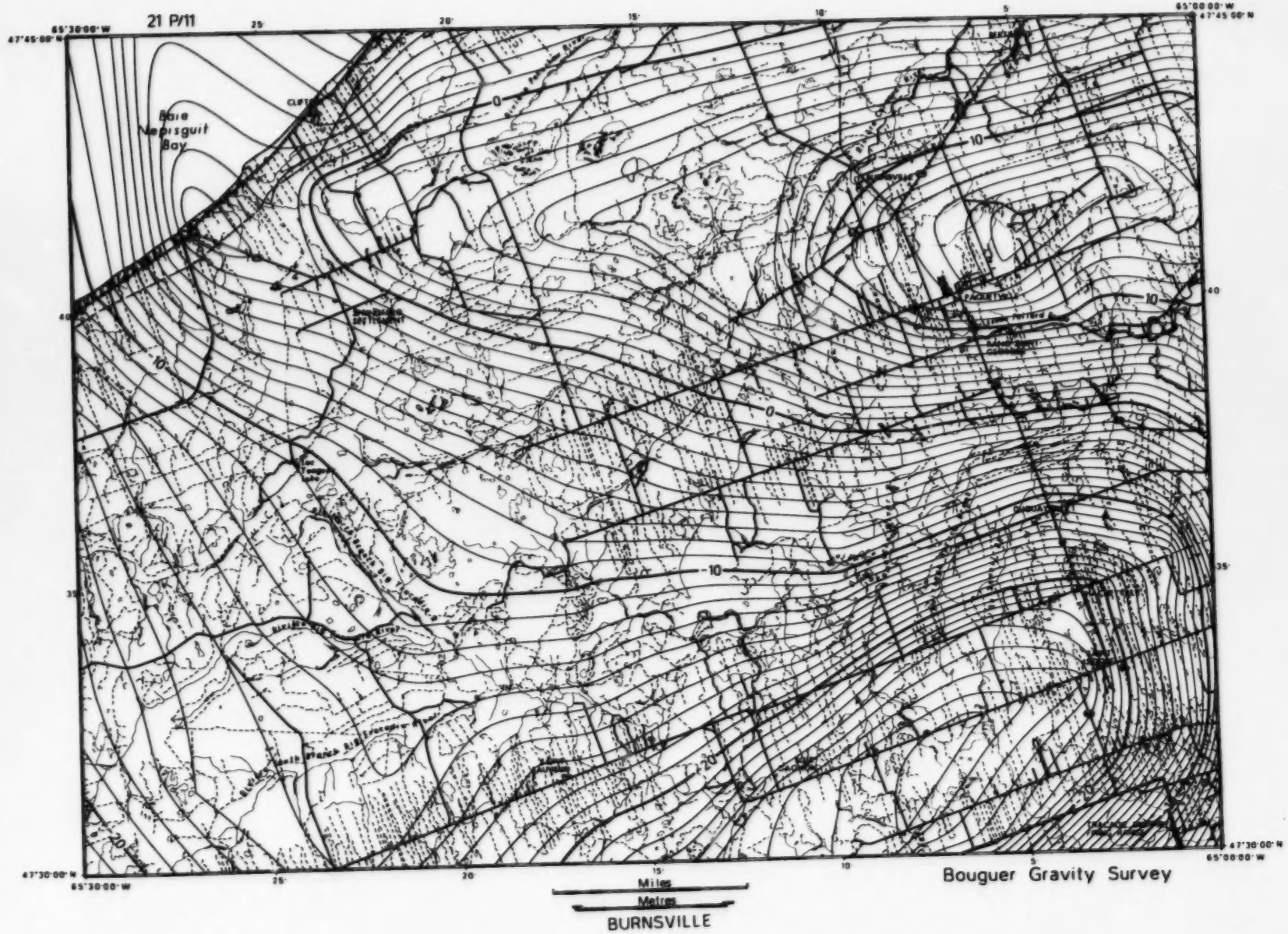

21 P/06
65°30'00"W
47°30'00"N
65°00'00"W
47°15'00"N
TRACADIE MILITARY TRAINING AREA
Baie Neguac Bay
Miles
Metres
TABUSINTAC RIVER
Freeair Gravity Survey

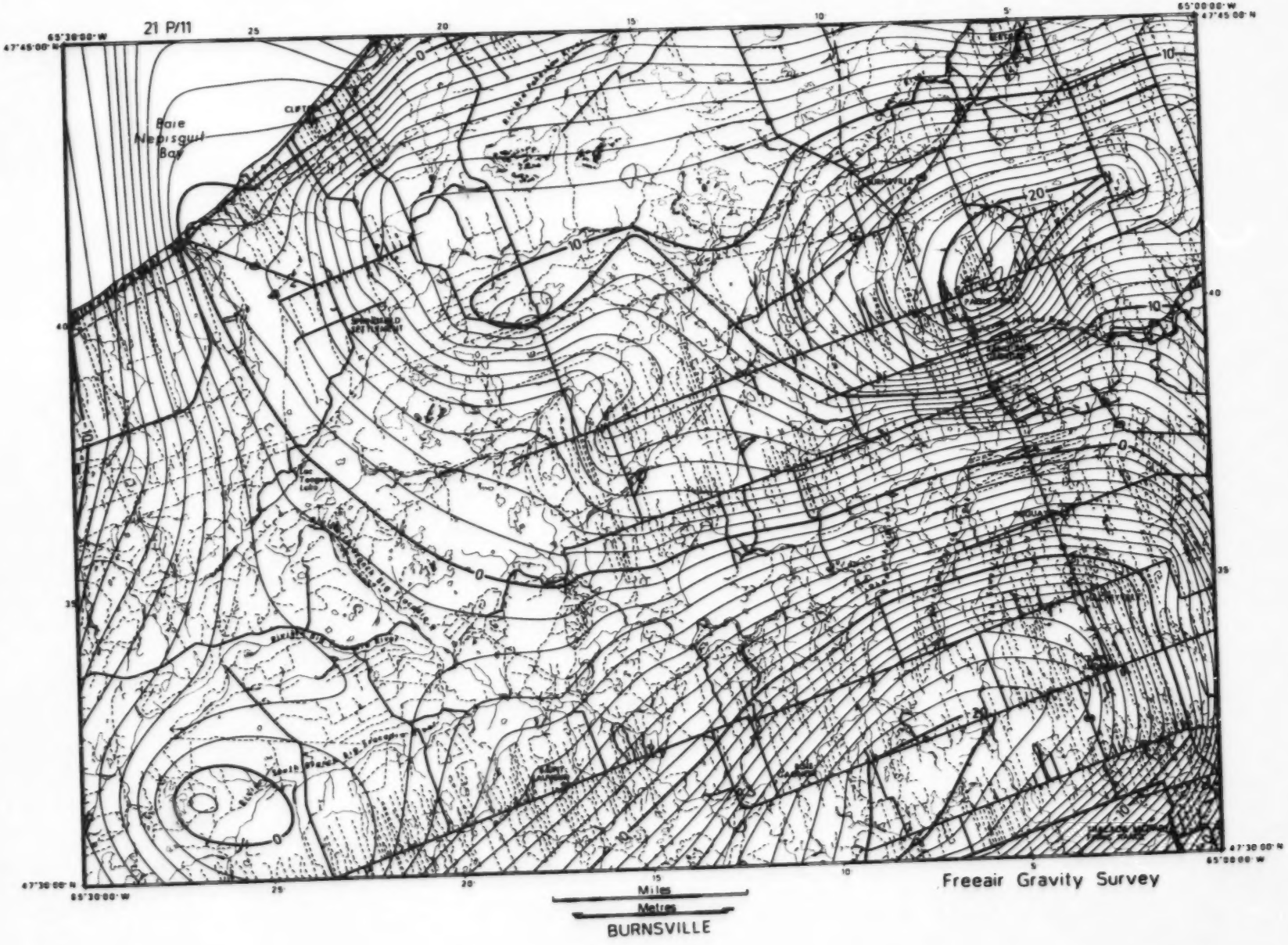

21 P/07
65°00'00"W
47°30'00"N
55'
50'
45'
40'
35'
64°30'00"W
25'
20'
47°15'00"N
Ile au Chevreuil Island
Rivière Ste-Françoise River
PARC PROVINCIAL VAL COMEAU PROVINCIAL PARK
Baie Tabusintac Bay
Baie Verte Bay
Baie Miramichi Bay
-10
-20
GOLFE SAINT-LAURENT
GULF OF SAINT LAWRENCE
Miles
Metres
WISHART POINT
Bouguer Gravity Survey

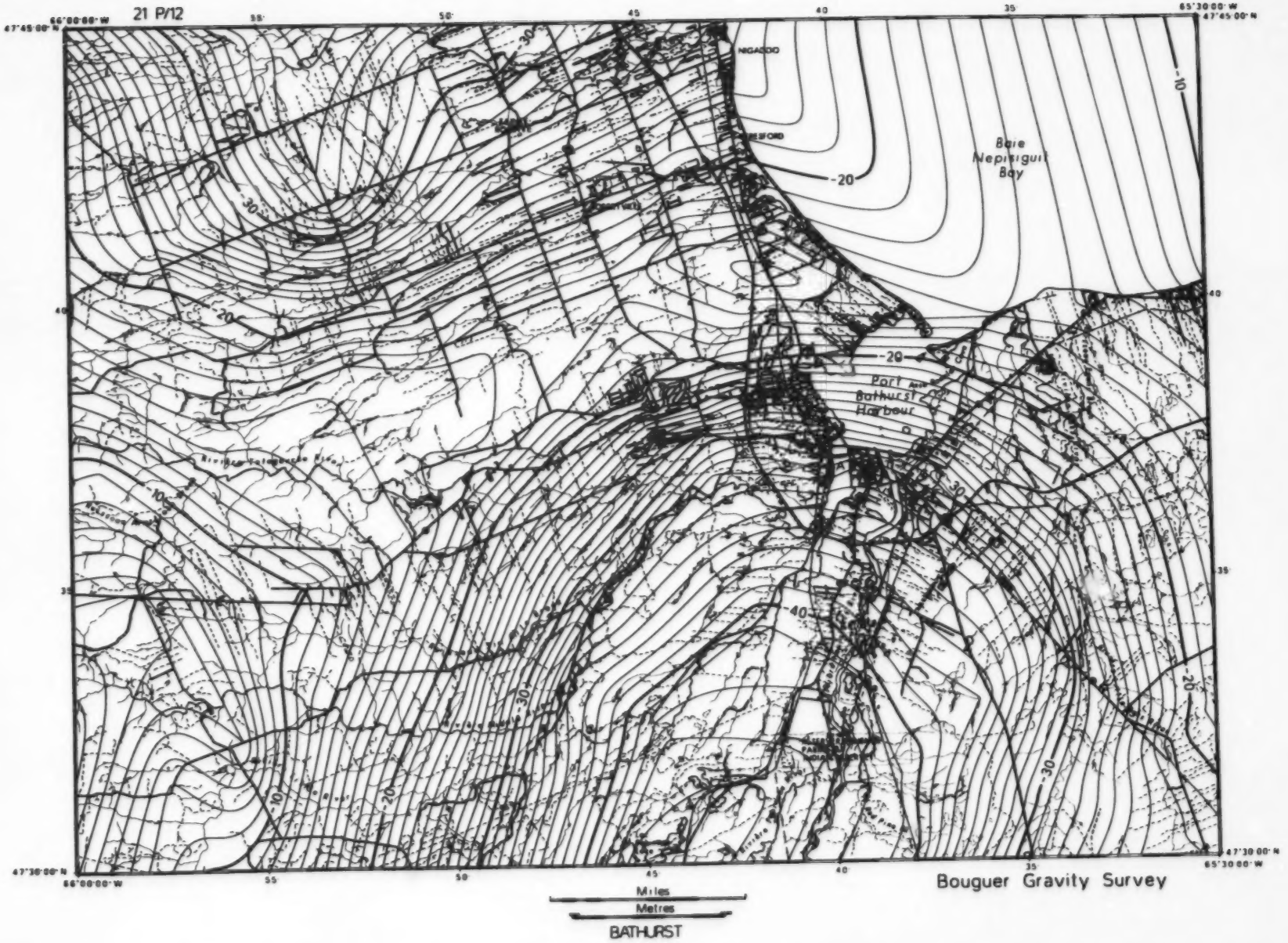

21 P/07
65°00'00" W
64°30'00" W
47°30'00" N
47°15'00" N
55
50
45
40
35
25
20
0
-10
-20
PARC PROVINCIAL
VAL COMEAU
PROVINCIAL PARK
Ile au
Chevreuil
Island
Baie des Chaleurs
Baie Tabusintac Bay
Baie
Miramichi
Bay
Baie
Neguac
Bay
GOLFE SAINT-LAURENT
GULF OF SAINT LAWRENCE
Miles
Metres
WISHART POINT
Freeair Gravity Survey

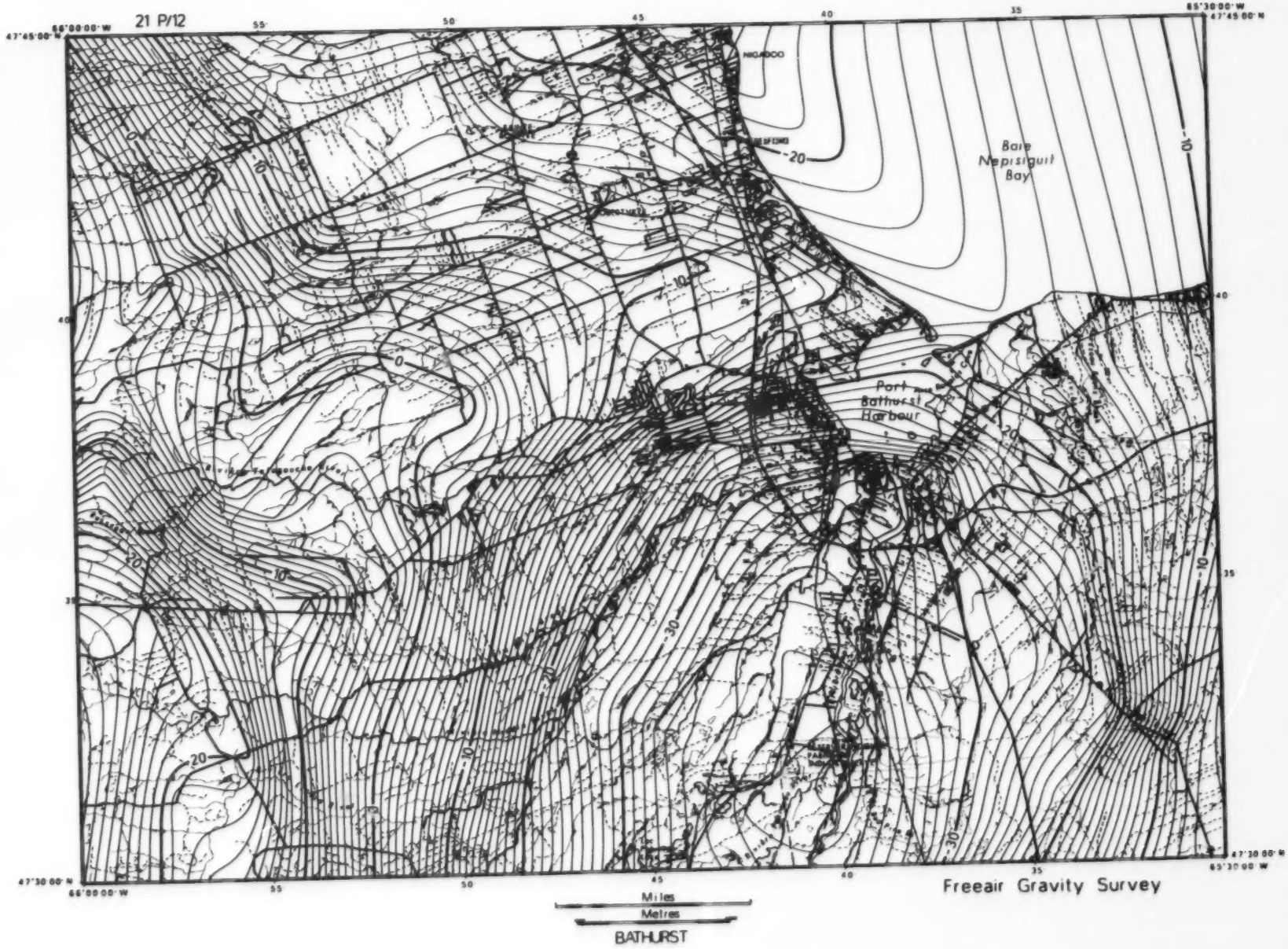

21 P/10
65°00'00" W
47°45'00" N
55'
50'
45'
40'
35'
64°30'00" W
Baie Saint-Simon-Nord
Port Shippagan Harbour
Baie Saint-Simon-Sud Bay
Baie de Pokemouche Bay
Baie de Tracadie Bay
GULF OF ST LAWRENCE
Ggolfe St-Laurent
-20
-10
0
10
TRACADIE
47°30'00" N
Miles
Metres
Bouguer Gravity Survey

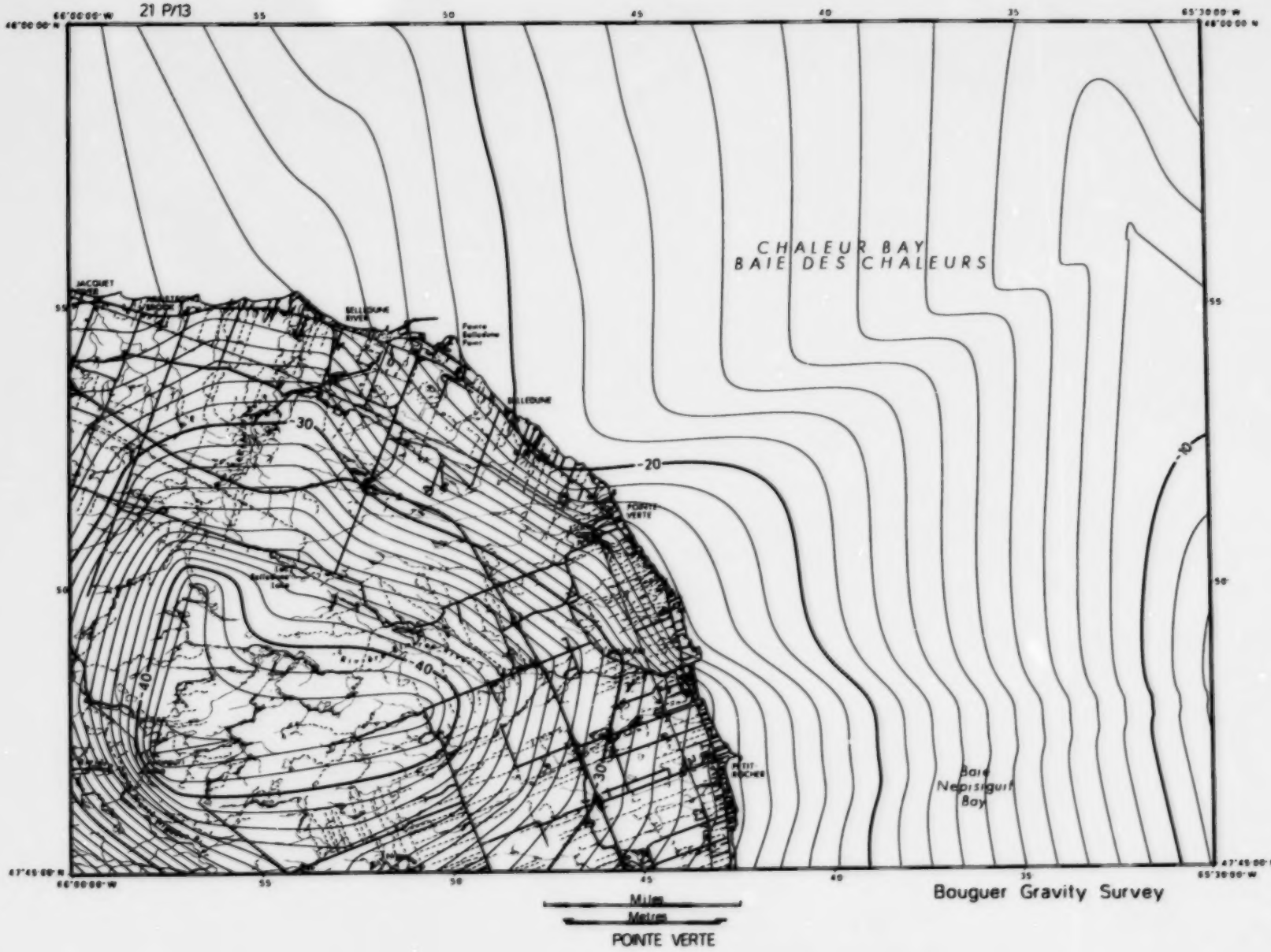

21 P/10
65°00'00" W
47°45'00" N
55'
50'
45'
40'
35'
64°30'00" W
47°30'00" N
Baie Saint-Simon Nord Bay
Baie Saint-Simon Sud Bay
Port Shippagan Harbour
Baie de Pokemouche Bay
Baie de Tracadie Bay
GULF OF ST LAWRENCE
GOLFE ST-LAURENT
0
10
20
Miles
Metres
TRACADIE
Freeair Gravity Survey

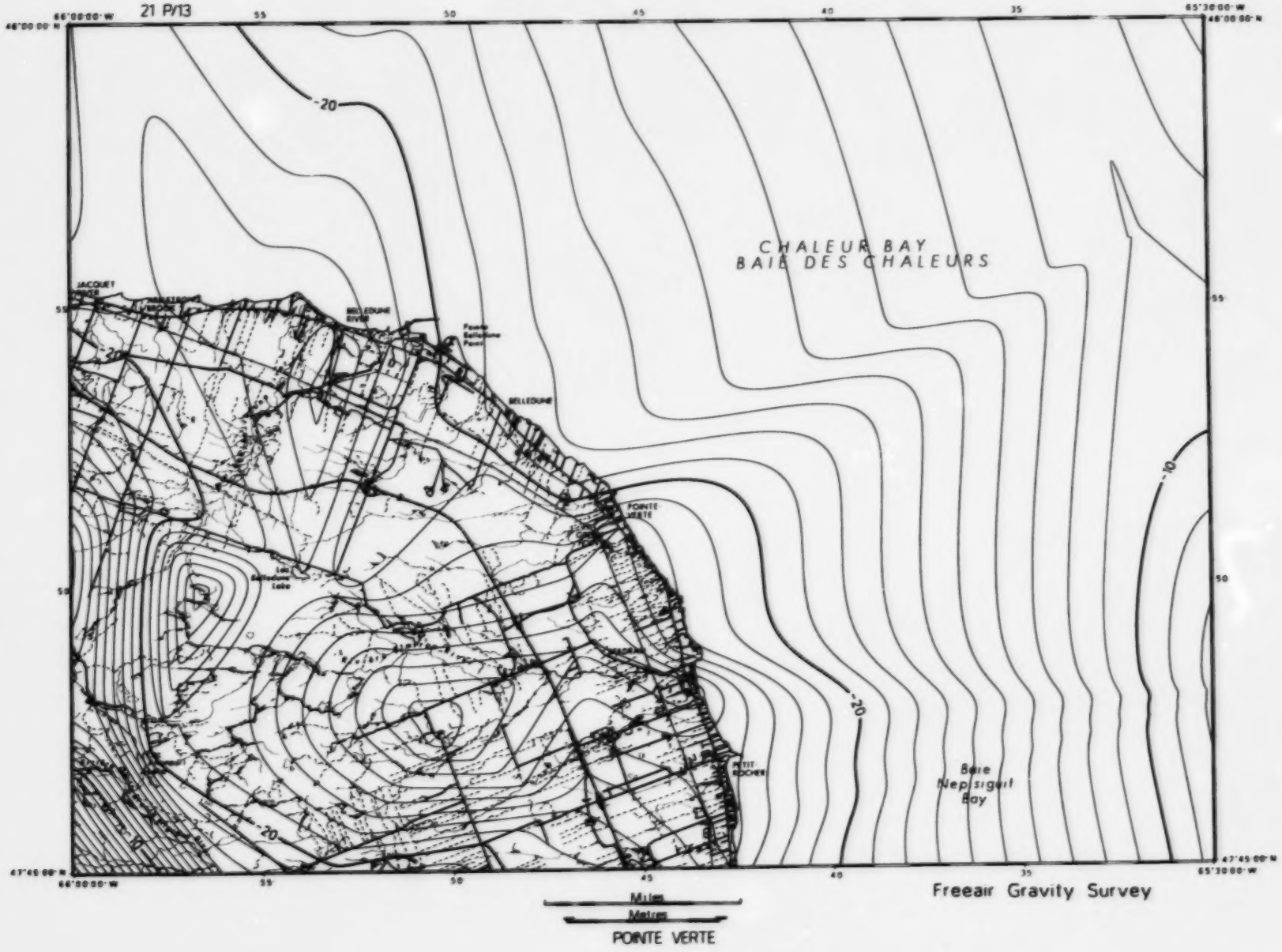

21 P/11
Baie Nepisguit Bay
Bouguer Gravity Survey
Miles
Metres
BURNSVILLE


21 P/11
65°30'00" W
47°45'00" N
Baie
Nepisguit
Bay
65°00'00" W
47°45'00" N
47°30'00" N
65°30'00" W
65°00'00" W
47°30'00" N
Miles
Metres
BURNSVILLE
Freeair Gravity Survey

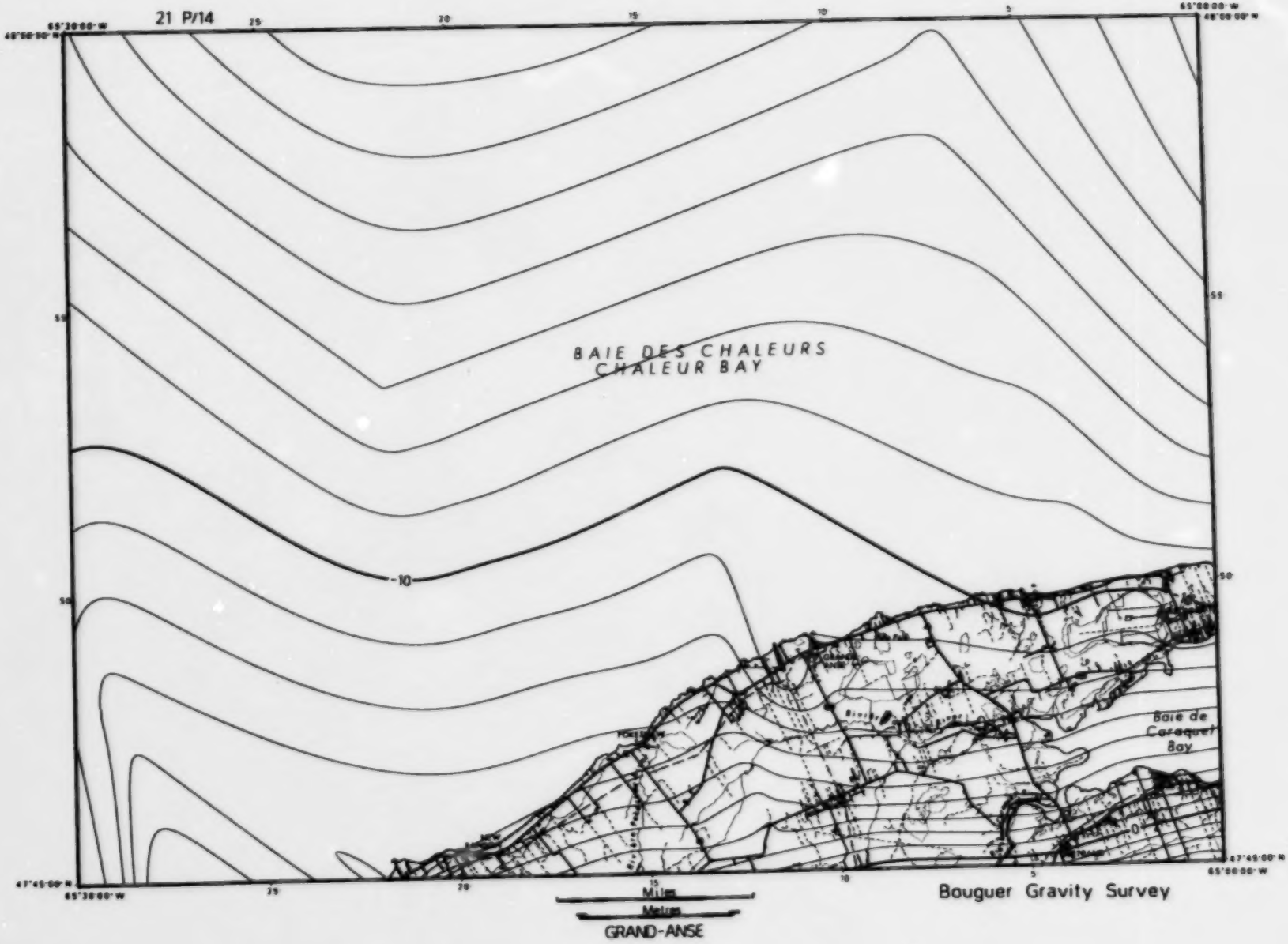

21 P/12
66°00'00"W
65°30'00"W
47°45'00"N
47°30'00"N
55
50
45
40
35
NEGADDO
RESFORD
Baie Nepisiguit Bay
Bay
Port Bathurst Harbour
-10
-20
-30
-40
Miles
Metres
BATHURST
Bouguer Gravity Survey

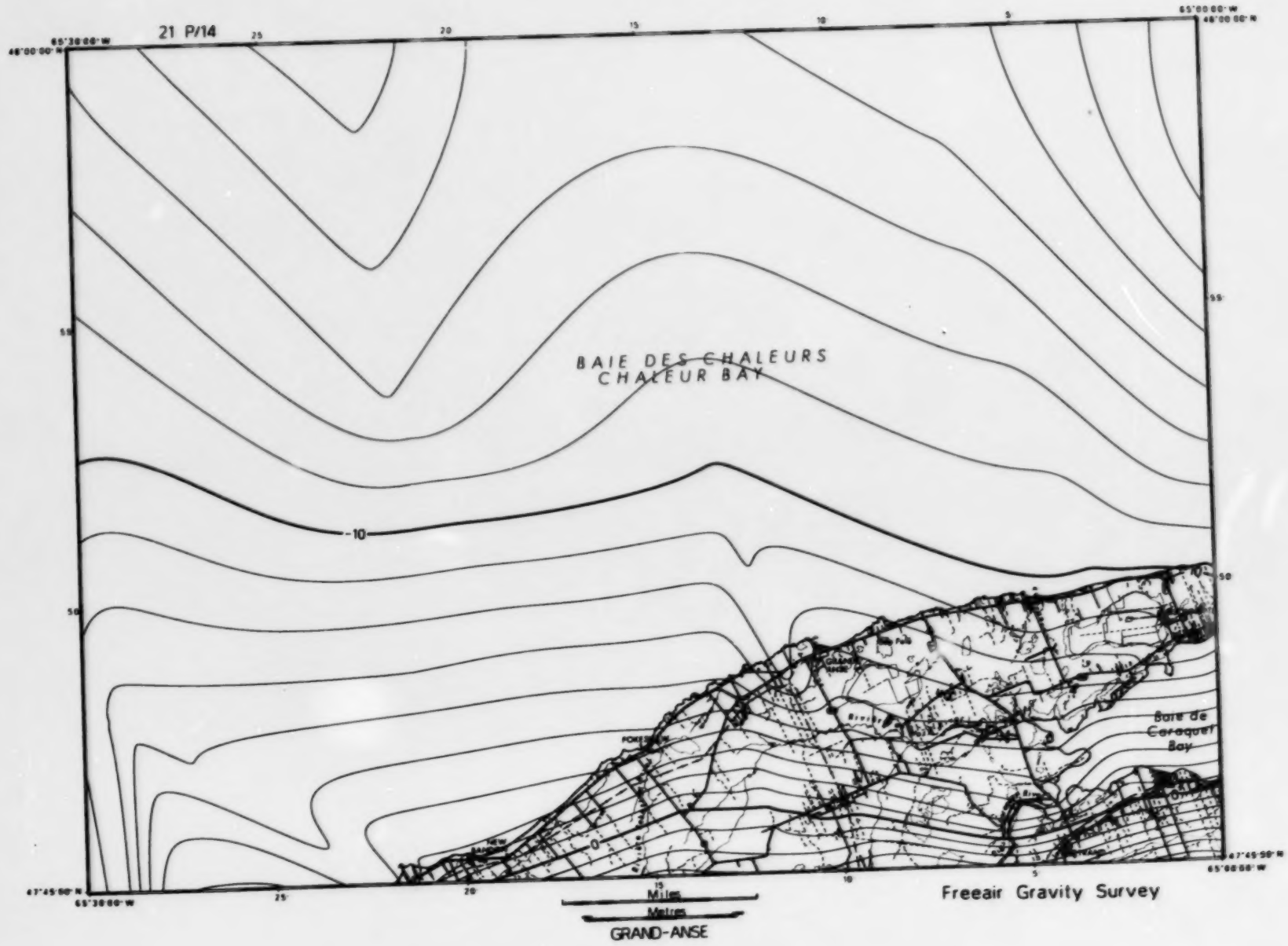

21 P/12
Bare
Nepisiguit
Bay
Port
Bathurst
Harbour
Miles
Metres
BATHURST
Freeair Gravity Survey

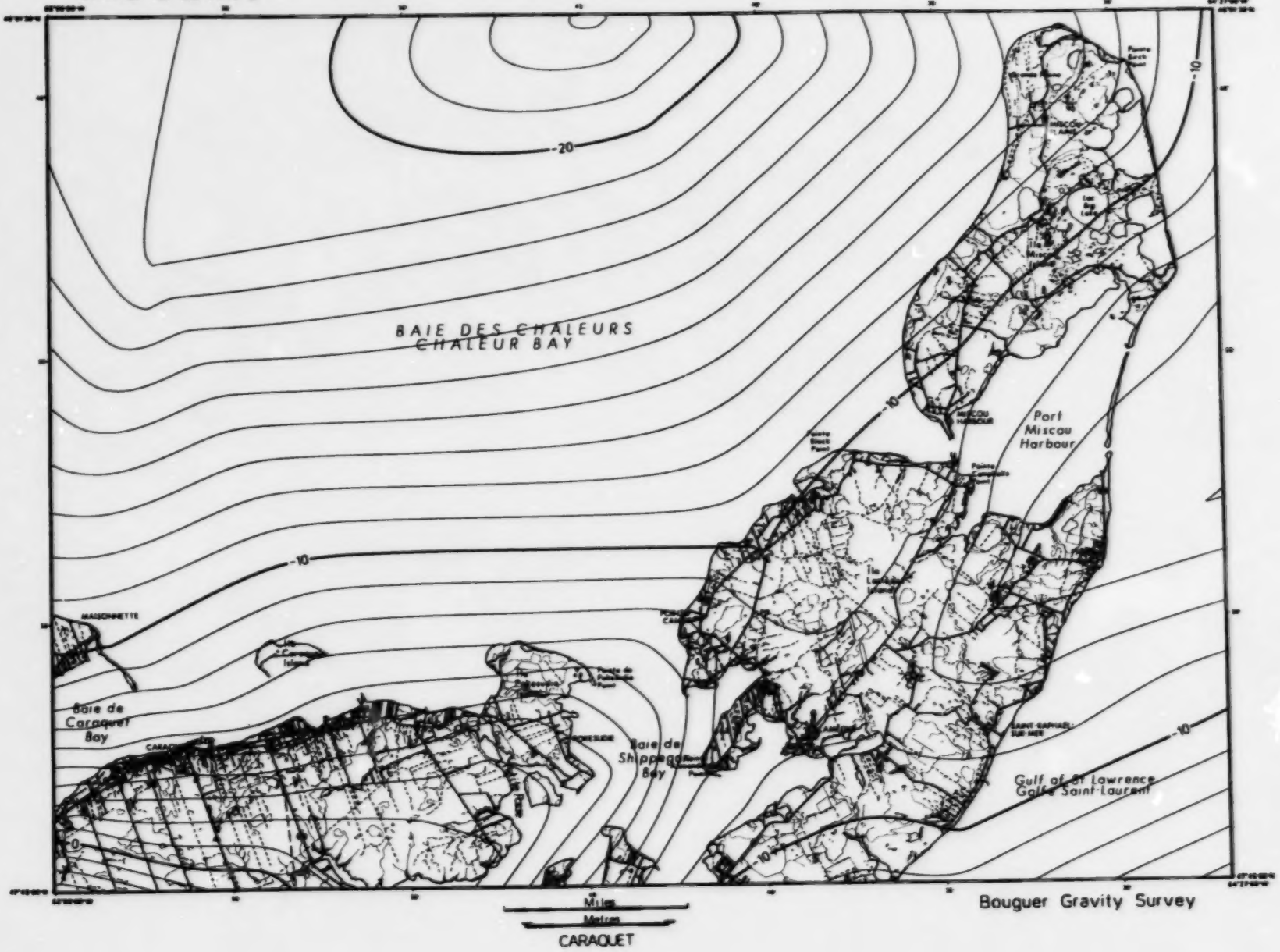

21 P/13
CHALEUR BAY
BAIE DES CHALEURS
-30
-20
-10
-40
-40
-30
JACQUET RIVER
BELLEDUNE RIVER
BELLEDUNE
POINTE VERTE
PETIT ROCHER
Bay
Baie
Nepisiguit
Bay
Miles
Metres
POINTE VERTE
Bouguer Gravity Survey



Freeair Gravity Survey

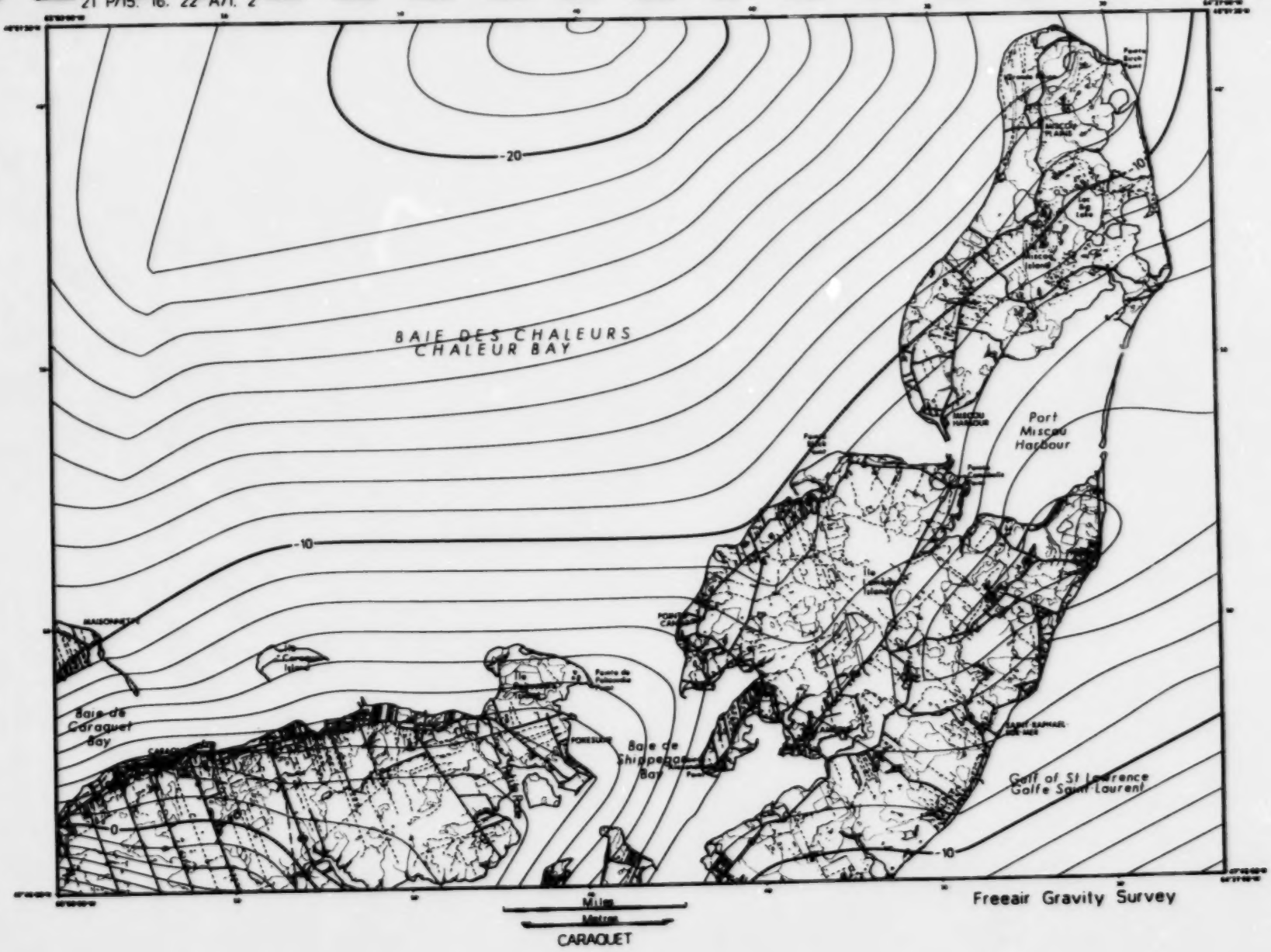

21 P/14
BAIE DES CHALEURS
CHALEUR BAY
-10
0
Baie de
Caraquet
Bay
Miles
Metres
GRAND-ANSE
Bouguer Gravity Survey


21 P/14
BAIE DES CHALEURS
CHALEUR BAY
-10
0
Baie de
Caraquet
Bay
Miles
Metres
GRAND-ANSE
Freeair Gravity Survey

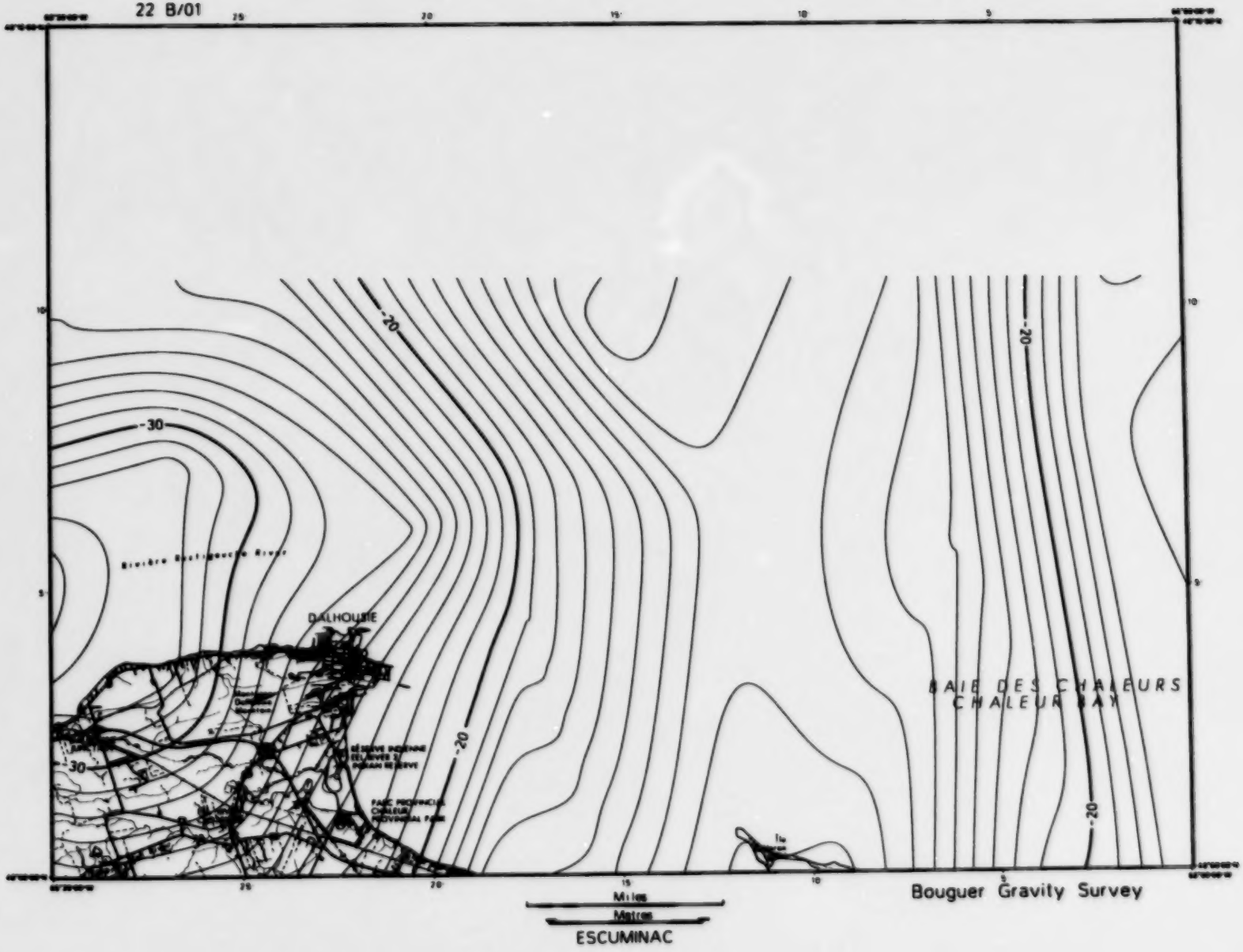


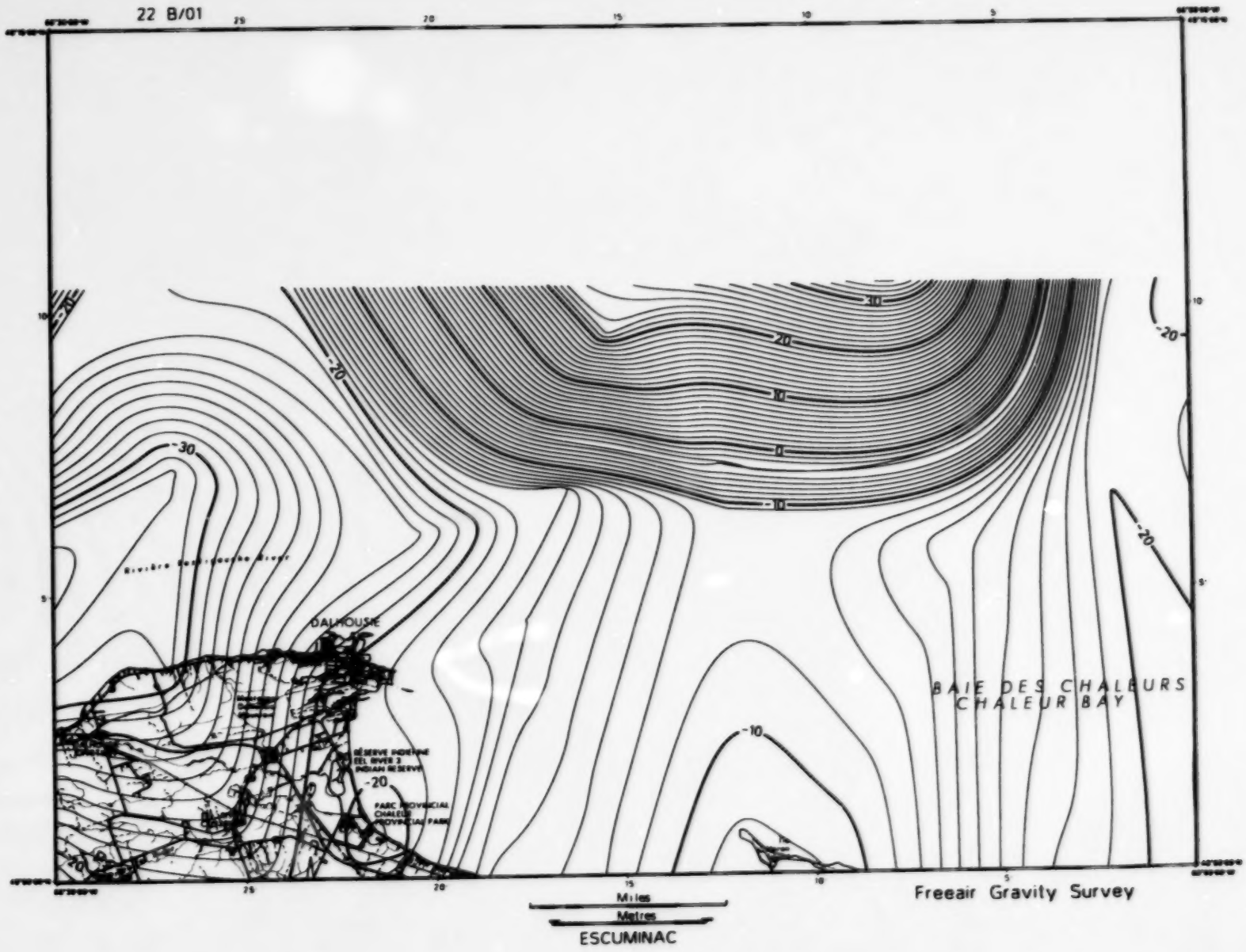
Bouguer Gravity Survey

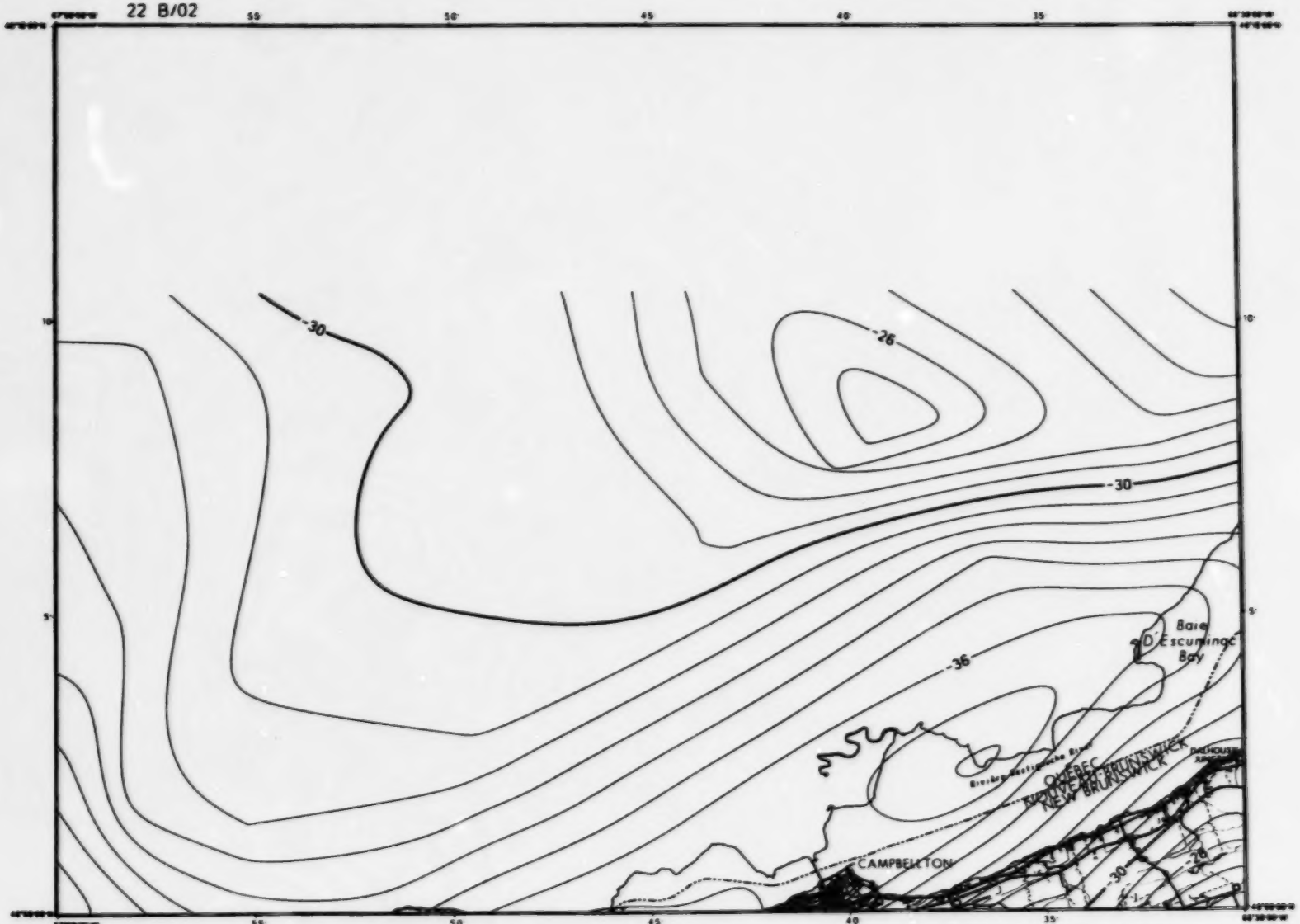
21 P/15. 16. 22 A/1. 2



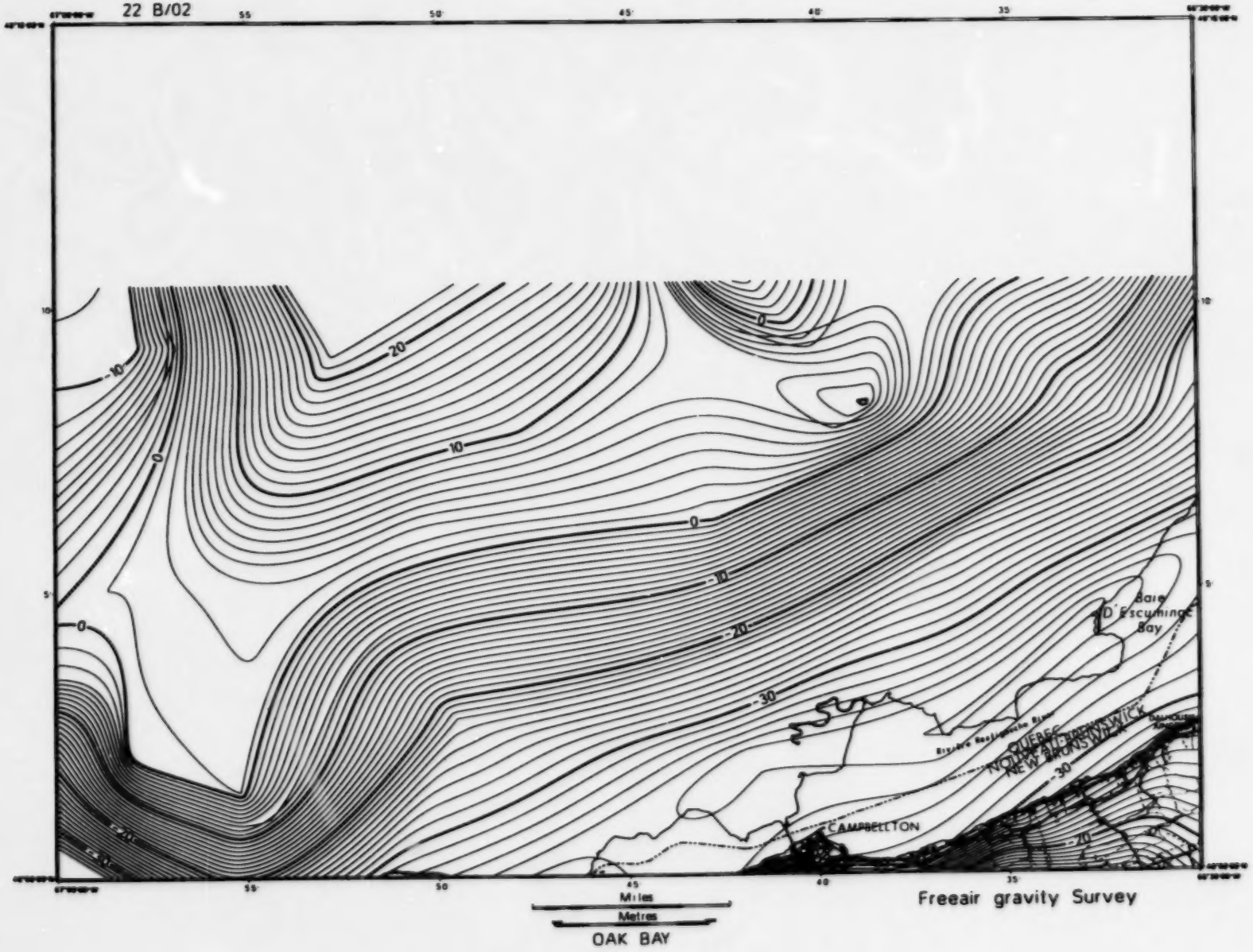
Freeair Gravity Survey


22 B/01
-30
-20
-20
-20
-30
DALHOUSIE
BAIE DES CHALEURS
CHALEUR BAY
Miles
Metres
ESCUMINAC
Bouguer Gravity Survey


22 B/01
30
20
10
0
-10
-20
-30
DALHOUSIE
BAIE DES CHALEURS
CHALEUR BAY
Miles
Metres
ESCUMINAC
Freeair Gravity Survey



Bouguer Gravity Survey


22 B/02
55
50
45
40
35
10
5
0
-10
-20
10
0
-10
-20
-30
-30
-20
Baie D'Escuminac Bay
QUEBEC
NOUVEAU-BRUNSWICK
NEW BRUNSWICK
CAMPBELLTON
Miles
Metres
OAK BAY
Freeair gravity Survey

APPENDIX II

Gravity Data Description

(2000-1README.TXT)

APPENDIX II - Gravity Data Description

FIELD	DESCRIPTION
proj	A project number in the form YYNNN where YY is the year of observation. NNN is a number that indicates the source of the data, as follows: 000 = Earth Physics Branch 001 = New Brunswick Department of Natural Resources 002 = University of New Brunswick (Dr. K.B.S. Burke) 003 = Nova Scotia Research Foundation 004 = Allan Spector and Associates Ltd. 005 = Chevron Canada Resources Ltd.
stn	A station number in the form NNNNNNYY where NNNNNN is the serial number of observations and YY is the year of observation.
declat	The latitude in decimal degrees. North latitude is positive, south latitude is negative.
declong	The longitude in decimal degrees. West longitude is negative, east longitude is positive.
cav	The accuracy of the coordinates in metres.
elev	The elevation in metres above sea level.
eav	The accuracy of the elevation in metres.
depth	The depth of water or thickness of ice in metres.
dav	The accuracy of the depth or thickness in metres.
dsf	The type of observation, as follows: 0 = A depth of water or thickness of ice was present but was not measured. 1 = An observation taken on land. 2 = An observation taken on the surface of an ocean or lake. 3 = An observation taken on the bottom of an ocean or lake. 4 = An observation taken on an ice cap 5 = An observation taken on an ice-covered ocean or lake.

adjg	The observed value of gravity referred to IGSN71.
gav	The accuracy of the observed gravity.
tcor	The terrain correction in milligals.
tav	The accuracy of the terrain correction.
free-air	The free-air anomaly in milligals.
fav	The accuracy of the Free-air anomaly computed using the accuracies of the values used in its computation.
bouguer	The Bouguer anomaly in milligals.
bav	The accuracy of the Bouguer anomaly computed using the accuracy's of the values used in its computation.
status	The status of the observation, as follows. A = Active B = Deleted C = Repeated

MAPS NOT FILMED

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